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CONTENTS

Ground Forces

Air Forces

Naval Forces

Military Economy and Infrastructure

Reports, Events and Facts

Colored Insets:

- FRG 'Wildcat' SP AA System
- "Hayou" Class Missile Patrol Boats
- British Mark-8 General Purpose Turreted Single Gun Artillery Mount
- French Mirage-2000N Fighter-Bomber

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SOVIET MILITARY JOURNAL ON U. S. RELIANCE ON NUCLEAR WAR

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 7-14

[Article by I. Perov: "U. S. Reliance on Nuclear War"]

[Text] Periodically there appear important publications in the foreign press on strategic military issues. A book entitled "The SIOP -- Secret U. S. Plan for Waging Nuclear War"* published in the U. S. in the first half of the 1980s may be of definite interest to the readers.

The book was published by two authors: Peter Pringle, a well known American journalist in the field of nuclear weapons, and William Arkin, a former military intelligence specialist (today an employee of the Washington Institute for the Study of Political Problems). According to the authors, they used materials from the 1940s and 1950s declassified by the Pentagon, which concern plans for U. S. nuclear war against the Soviet Union; the results of conversations with American civilian and military officials, both active and retired; as well as meetings with officers from the U. S. Air Force Strategic Air Command (SAC), held during visits by the authors to a number of SAC missile and air bases.

Although the book's authors did not pose to themselves the task of analyzing the reasons for the arms race in the United States, the information they brought out enables the reader to conclude that the policy of all American administrations in the field of nuclear weapons development has always pursued the goal of achieving complete nuclear superiority in the world. During the past 40 years the evolution of the majority of American strategies was subordinated to the main goal -- how to use the U. S. nuclear arsenal most "advantageously," in order to destroy the Soviet Union and ensure U. S. survival in a general nuclear war. This idea has become most obsessive with the current Washington administration. It is precisely for this reason that the authors begin the book with a description of the largest strategic command and staff exercise in the history of the country, called Ivy League, held in March 1982. Members of the Reagan Administration led by the President took part. They attempted, if only in a conditional situation, to become

*SIOP -- Single Integrated Operating [sic.] Plan --Yedinyy obyedinennyy operativnyy plan (SIOP).

acquainted with the subtleties of military art on the preparation, unleashing and waging of modern general nuclear war.

For the first time in the history of the United States, emphasize the book's authors, were the following situations really worked out at the highest governmental level in all details: under what circumstances, when, where, why and by whom in the U. S. will a decision be made to employ strategic nuclear forces; and who will issue the order to employ the more than 10,000 strategic nuclear weapons (the yield of each ranging from 50 kilotons to 9 megatons) against the main targets among the 40,000 located on the territories of the Soviet Union, the other socialist countries, as well as neutral and even friendly states, which are enumerated in the SIOP plan.

As the basis for the Ivy League exercise scenario, it is emphasized in the book, one of numerous variances of the SIOP plan was taken, the essence of which is as follows.

An armed conflict arises on the Korean Peninsula between the DPRK [Democratic People's Republic of Korea] and the Seoul regime.

As always in such situations, the Warsaw Treaty Organization states are represented as the aggressor. Their armed forces are attacking and threatening to defeat NATO forces, most of all in the Central European TVD [Theater of Military Operations]. In this situation the U. S. President makes the decision and issues the order for "limited" employment of nuclear weapons against Warsaw Treaty Organization troops and facilities. According to the exercise plan, later, through exercise inputs escalation of the use of nuclear weapons begins. As a result the "limited" nuclear war grows into a general nuclear war. The U. S. transitions to the unlimited use of all the nuclear weapons in its arsenal, most importantly strategic forces.

In Exercise Ivy League former Secretary of State Rogers served as U. S. President and former CIA Director Helms as vice president; i.e., individuals sufficiently informed about U. S. "nuclear strategy" from their prior positions.

During the exercise, emphasize the book's authors, the whole complex of actions of the President, the federal government and the military leadership was played in detail including, in particular, the organization and implementation of evacuation from Washington on the eve of nuclear war of members of the U. S. Government to protected control posts. Even the question of transfer of presidential authority in the case of the death of the head of state was worked out. In this regard, according to the scenario authority shifted to the vice president, located in the airborne command post of the U. S. Armed Forces Joint Chiefs of Staff, and command and control of the country during the global nuclear war was implemented from the air. The capability and effectiveness of the command, control and communication systems of the armed forces were tested in every detail. Civilian departments and agencies worked out their own plans for operations under emergency conditions.

Concerning this exercise the West German journal STERN wrote as follows: "This game with nuclear death is an historic turning point. The fact is that, after the March 1982 exercise it became utterly clear that for Reagan and his administration the beginning of nuclear war is not automatically the beginning of the end. In their opinion it is possible to wage even such a war in a limited fashion and, possibly, even to win. By accepting this premise the Reagan Administration disassociated itself completely from the main principles which its predecessors adhered to."

We will not argue about the accuracy of the assessment by the West German journal of the evolution of U. S. "nuclear strategy." However, we will note that in the final chapters of the book the authors show with specific facts and figures that all American administrations, from the moment that the United States possessed a monopoly on nuclear weapons until our own day, never got away from the delirious idea of its most advantageous use against the Soviet Union and the other socialist countries, to achieve complete world domination.

Back in the late 1940s, the authors indicate, when the U. S. had in its arsenal a limited number of nuclear bombs, the Pentagon planned to employ them against Soviet cities. Thus, the American plan for waging war against the Soviet Union code named Trojan (1948) envisioned making a strike with 133 nuclear bombs against 70 Soviet cities. It pursued the main objective of destroying the population and the main economic centers and military facilities of the Soviet Union. Such a nuclear strike against the USSR, according to the plan of the American leadership, was to create favorable conditions for the United States to achieve an undisputed victory in the war and the destruction of the socialist system.

In the 1950s an American plan for waging war against the USSR had the code name Dropshot. According to this plan, victory over the USSR was to be achieved by waging war according to the following stages:

The first was to carry out large scale air operations with the use of nuclear and conventional weapons to destroy up to 85 percent of the economic capability of the Soviet Union. It was anticipated that nuclear weapons would be used from the first days of the war. The use of a total of 300 atomic bombs was planned.

The second stage was to complete the deployment of the U. S. Armed Forces and those of its Russian allies (up to 164 divisions) to wage a strategic offensive operation against the USSR.

The third stage was to conduct decisive offensive operations to seize territories of the Soviet Union and of the people's democracies.

The fourth was to eliminate the socialist system, establish control over USSR territory and that of its allies and observe the fulfillment of the surrender conditions.

As the authors note, as nuclear weapons and their delivery means increased in the U. S., the scale of plans for their employment expanded. Thus, already in 1949 104 Soviet cities were listed as priority targets for nuclear

destruction. It was planned that 220 nuclear bombs would be used against them and 72 held in reserve.

In 1953 SAC had 1,500 strategic bombers, including 1,000 nuclear weapons-carrying aircraft. In the early 1950s, the book emphasizes, the U. S. arsenal began to be supplemented by tactical nuclear weapons of from 1 to 50 kilotons yield, which were intended for use in overseas TVD, especially in Europe. As a result, by early 1954 the U. S. already had approximately 1,000 strategic and tactical nuclear weapons. Their number continued to grow rapidly and in the second half of the 1950s it doubled.

U. S. nuclear war plans already listed 2,997 targets of destruction on the territory of the USSR and the other socialist states, including 118 cities and 645 airfields. According to the assessment of Pentagon strategists of that time, a U. S. nuclear strike against the USSR and the other Warsaw Treaty Organization countries would kill no fewer than 70 million people.

In 1957 there appeared 3,261 targets on the American nuclear war plan and by 1960 they numbered up to 20,000. More than 1,700 targets were targets of priority destruction. The use of 700 nuclear weapons was planned against 409 airfields alone. "As a result of such a strike," American strategist William Moore noted cynically in his memoirs, "in two hours all that will remain of Russia will be smoke, radiation and ruins."

By fall 1960, the authors write, the composition of U. S. offensive strategic forces began to be supplemented by a new component -- nuclear missile submarines. Adm A. Burke, U. S. Navy Chief of Naval Operations at the time, reported to Congress that it was necessary for the American strike fleet to have 45 PLARB [ballistic missile submarines (SSBN)], of which 29 were to be on continuous combat patrol prepared to launch their missiles immediately. These forces, according to the assessments of the American admiral, were capable of destroying 464 important stationary targets on the territory of the Soviet Union, which would be "sufficient to destroy all of Russia."

At the present time, as in the past, the battles continue between the leading military industrial firms in the United States to obtain the largest and most long term Pentagon orders for the creation and production of the latest costly strategic weapons systems. In response to the plans of the Department of the Navy about the creation of an armada of nuclear missile submarines, U. S. Air Force representatives immediately came up with a "substantiation of the insufficient effectiveness" of the Polaris naval missiles for destruction of Soviet ICBM launch silos. They attempted to prove the advisability of a further buildup of strategic forces on land and the need to have 3,000 Minuteman ICBM, 150 Atlas, 110 Titan and 900 strategic bombers.

The arsenal of many thousands of U. S. nuclear weapons and the increasing number of strategic and tactical weapons carriers, in the opinion of the Pentagon, required that a single operations plan for waging nuclear war be developed in the U. S.

At the decision of the President a special nuclear war planning office was created in the U. S. Armed Forces (subordinate to the commander of the

Strategic Air Command). The main mission of this office was to determine nuclear strike targets on the territories of the Warsaw Treaty Organization states and other countries. The size of the office was defined: 269 generals, admirals and officers (219 from SAC; 29 from the U. S. Navy; 10 from the U. S. Army; 8 from the U. S. Air Force and 3 from the U. S. Marine Corps).

In December 1960 the first U. S. unified operation plan for waging nuclear war (SIOP Plan) was developed. This plan called for a massive nuclear strike employing up to 4,000 strategic nuclear weapons against the USSR and the other socialist states.

When President Kennedy arrived at the White House in January 1961, at his instruction a re-examination of the American strategy of "massive retaliation" began. New principles for waging nuclear war were developed under the leadership of U. S. Secretary of Defense MacNamara, which were reflected in the strategy of "flexible response." It provided for, along with a massive nuclear strike against the Soviet Union and the other socialist countries, also so-called "incremental" use of strategic forces, commensurate "with the level of danger which has arisen to the U. S." That is, the possibility of waging a brief conventional war and then shifting to the use of tactical nuclear weapons, and in a critical situation also strategic nuclear forces, was examined.

As the authors emphasized, discussions about so-called "limited" nuclear war against the USSR were always merely a political screen for the U. S. leaders, for the chief variant in all American plans for waging nuclear war was a massive nuclear strike against the USSR and the other Warsaw Treaty Organization countries.

In summer 1961 President Kennedy approved a new variant of the SIOP Plan. It distinguished the following main nuclear strike variants:

-- first, destruction of the strategic nuclear forces of the Soviet Union (ICBM silo launchers, nuclear missile submarine bases, strategic aviation airfields and other most important military objectives);

-- second, a nuclear strike against air defense forces and resources, especially those located in the flight paths of American strategic bombers over USSR territory;

-- third, destroying with nuclear weapons the air defense forces and resources covering major cities and industrial centers;

-- fourth, making nuclear strikes against command posts of civilian and military leaders of the socialist states;

-- fifth, making a so-called "paralyzing nuclear strike;" i. e., massive employment of nuclear weapons against the entire complex of civilian and military targets in the USSR and other Warsaw Treaty Organization Countries.

Pentagon leaders, having assessed the state of the strategic nuclear forces of the Soviet Union in the first half of the 1960s, appealed to the President and

Congress with substantiation for the need to further develop U. S. strategic offensive forces. Secretary of Defense MacNamara, speaking in Congress on this matter in 1964, stated that to achieve victory in nuclear war against the Soviet Union, the People's Republic of China and the other socialist countries, U. S. strategic forces required the capability to destroy 25-33 percent of the population and 67 percent of the industry of the USSR in its first strike. The Secretary asserted that substantial improvement in the entire system of command, control and communications in the armed forces was also required, in order to ensure stable command and control of both nuclear and conventional forces during a general nuclear war.

The U. S. began to implement a large scale, multi-million dollar program for creating a global command, control and communications system. It included the construction of numerous nuclear-hardened command posts on U. S. territory for the governmental and military leadership, extensive deployment of satellite communications, organization of airborne command posts and automated command and control systems, and other measures. In short, the next large scale stage in U. S. preparations for waging nuclear war had begun. On 3 February 1961 continuous combat patrolling by an airborne command post, which continues to the present time, began in the SAC command and control system. Its main purpose is command and control of SAC forces in the event that war begins by surprise and ground command posts are knocked out.

In 1980 the American listing of potential nuclear strike targets; i.e., SIOP Plan, designated 40,000 targets, including: more than 900 Soviet cities with a population exceeding 25,000 persons; more than 3,500 military facilities and more than 300 industrial and economic centers.

The nuclear strike targets are grouped in the following four categories:

-- USSR nuclear forces: ICBMs and IRBMs [intermediate range ballistic missiles], their control (launch) points and centers, nuclear weapons depots, long range aviation airbases and ballistic missile submarine bases;

--General purpose forces: garrisons, MTO [materiel support] points and depots, troop concentration areas, airfields and military equipment depots;

-- Control posts for military and political leaders and main communication centers;

-- Economic and industrial targets: enterprises producing weapons and military equipment, means of communication, oil industry factories, railroad centers, repair enterprises, industrial centers (facilities), supporting the economic restoration of the country; i.e., coal industry enterprises and enterprises for the production of steel, aluminum, cement and electric power.

According to these groups of objectives the SIOP-5D Plan distinguishes the following variants of nuclear strikes: massive, selective, limited and regional. In all of the variants, note the authors, the U. S. President can choose either a pre-emptive or a retaliatory nuclear strike.

In a massive pre-emptive nuclear strike against the USSR it is planned to destroy primarily ICBM launch silos, SSBN bases, major airfields and the employment areas of operational-tactical nuclear weapons. According to an assessment by American strategists a nuclear strike only against these indicated targets may lead to the death of from 3.7 million to 27.7 million people. The SIOP Plan also includes thousands of targets located on the territories of the Warsaw Treaty Organization countries, China, Cuba and Viet Nam, as well as targets on the territories of "allied and neutral states."

In the United States, as nuclear forces and command, control and communication systems were improved and developed, early warning systems were also developed. As the book emphasizes, numerous instances of outages and false responses have been noted in the functioning of the U. S. nuclear missile strike warning systems, which inevitably lead to bringing on-alert strategic forces to complete readiness. Thus, the authors note, at 0226 hours 3 Jun 80 a combat alert signal from the NORAD [North American Air Defense] command post was received at the SAC command post without any prior warning. On the screen depicting the aerospace situation there appeared data indicating that a Soviet SSBN had launched two missiles in the direction of the United States from an area in the North Atlantic. Having such information, a special group at the SAC command post immediately declared combat alert at ICBM launch control stations and for crews of on-alert strategic bombers. For several minutes all combat ready alert ICBMs and 76 B-52 strategic bombers at 19 airbases were brought to launch [takeoff] readiness.

Subsequently, NORAD command posts, as well as other U. S. Armed Forces command posts reported to the main KNSh [JCS] command post that they had no information about the supposed launch of missiles by a Soviet submarine from the area of the North Atlantic. As was later established, the false military alarm occurred as the result of an error by a NORAD command post operator, who introduced training information into the combat notification system.

On 9 Nov 79, also due to a similar operator error, a false alarm occurred at the NORAD command post, but about a massive launch of Soviet ICBMs against the U. S.

As the book emphasizes, the question of the reliability of the U. S. warning system was the subject of a special hearing in Congress, the members of which were extremely disturbed about the Pentagon's dangerous nuclear game. During the hearing the fact was brought up, related to March 1980, when a Soviet missile submarine located in the Kuril Islands area was carrying out training missile launches. Out of the four launches carried out by this submarine, one missile was evaluated by the American warning system as "creating a direct threat to the United States." And in this situation all on-alert strategic offensive forces were again brought to full combat readiness to make a nuclear strike against the USSR.

Overall, note the authors, in 18 months (through the end of June 1980) 3,703 false signals went to the NORAD command post from early warning systems, the reasons for which included its reaction to large fires and atmospheric phenomena (storms), which were initially evaluated as Soviet missile launches.

As a result of such an anti-socialist processing of the personnel in U. S. strategic nuclear forces, the authors bring up the following example from their meetings with American ICBM specialists. During a visit to one of the Minuteman missile launch command posts they asked this question to two young officers from the command post launch crew: "Do you ever think about where your missiles will fly?" One of the officers answered that this made absolutely no difference to him, that his main mission was to carry out the launch.

The American SIOP nuclear plan is systematically adjusted as nuclear forces are perfected. New strike targets on the territory of the socialist countries are included and other factors are taken into account. As an example the authors show that in 1972 the Pentagon carried out a modernization of the SIOP Plan in accordance with the so-called concept of "limited nuclear war" accepted in the U. S., which, in the opinion of the American leadership, was most probable in Europe and the Middle and Far East. According to an assessment by Schlessinger, at the time U. S. Secretary of Defense, the concept of "limited nuclear war" in Europe will provide for a reliable defense of Western Europe, but "the allies will have weighty justifications for asking us how we will react to a threat against them by Soviet intermediate and shorter range missiles." In reality, the American concept of "limited nuclear war" pursued the objectives of diverting nuclear war away from U. S. territory and limiting it, for example, to the territory of Europe and the Far or Middle East, attempting to turn the peoples of these regions into actual nuclear hostages. But in this regard the authors note justifiably that there is no guarantee that the "limited" nuclear conflict will remain such.

With the coming to power in January 1977 of the Carter Administration the next stage in the reexamination and refinement of U. S. "nuclear strategy" began. The book notes that during the years Carter was in office it issued five new directives concerning the plan for waging nuclear war. They not only codified the idea of a "counter force" strike against the USSR, but also substantially increased the number of variants of the SIOP Plan. But what is most important is that the task was assigned of giving to the country's strategic forces the ability to wage a protracted nuclear war.

Carter's Presidential Directive No 59 lay the foundations for the new American strategy of "direct confrontation," which in 1980 was officially approved by the Reagan Administration. This directive also approved a plan for the further qualitative development of the American strategic nuclear triad, and also improvement to the entire command, control and communication system, which was required to be capable to command and control U. S. strategic forces during a nuclear war. Plans for the creation of new "MX" ICBMs, Trident-II SLBMs and long-range nuclear cruise missiles for strategic aviation received complete approval; i.e., a qualitatively new stage in the strategic arms race began in the United States.

The authors posed the question: What fundamentally new was introduced by the Carter Administration in the field of United States "nuclear strategy?" In their opinion, priority in the American nuclear strike against the USSR is given to military targets, command posts and communication centers, as well as

to leadership command and control posts. In response to such a strike, note the authors, Soviet strategic nuclear forces will make a strike against 1,049 ICBM silo control posts, 4 SLBM bases and 46 strategic airbases. Losses to the U. S. population may reach 35 million people.

The authors note that in the event that U. S. strategic nuclear forces are used against military targets it will be virtually impossible for the enemy to determine immediately what kind of a strike it is -- massive or limited -- and whether or not it is only against military targets and control posts of the political and military leadership.

Summing up the developments of the "nuclear strategy" and the U. S. SIOP Plan during the Carter Administration, the authors emphasize that during this period the foundation was prepared for the still more aggressive Reagan Administration policy toward the Soviet Union, which relies on the possibility that the United States may wage a nuclear war and achieve "victory."

The authors of the book, "The SIOP -- Secret U. S. Plans for Waging Nuclear War" show convincingly that in recent years American ruling circles have been still further intensifying preparations for nuclear war. In the field of strategic weapons fulfillment of plans for the production and placing in inventory of new strategic "MX" ICBM launchers, "Ohio" Class SSBNs and B-1B strategic bombers, as well as re-arming B-52 aircraft as launch platforms for long-range cruise missiles, above the limits established by the Soviet-American SALT-II Treaty are in full swing. Deployment of intermediate range nuclear weapons in Europe and on U. S. Navy ships is being implemented. Preparations for the testing of a new, highly accurate naval ballistic missile, the Trident-II, are virtually complete. The pace of scientific research and experimental design work is quickening for the creation of the new Midgetman ICBM and the ATB strategic bomber through the Stealth Program. And what is most dangerous for the cause of peace are the virtually multi-billion dollar U. S. investments in the "Star Wars" program, with the aid of which the American administration and military-industrial complex are counting on achieving military superiority over the Soviet Union.

The adherence of the American leadership to the SOI [SDI -- Strategic Defense Initiative] Program is nothing other than unleashing a new stage in the arms race, a breakout to new types of weapons, especially space strike weapons, the creation of which will enable the Pentagon to add substantially to the adventuristic SIOP Plan, which places the world at the brink of catastrophe. In connection with this a much greater threat than ever before will arise that a world war will be unleashed and civilization on earth be destroyed.

The "Delhi Declaration of a World Free of Nuclear Weapons," signed in Delhi on 27 Dec 86 by CPSU Central Committee Secretary M. S. Gorbachev and R. Ghandi, prime minister of the Republic of India, emphasizes: "The danger hanging over mankind is great. But mankind possesses great forces to prevent catastrophe and lay the path to civilization without nuclear weapons..."

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THE IRAN-IRAQ ARMED CONFLICT

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 14-19

[Article by Col I. Guryanov: "The Iran-Iraq War"]

[Text] "In October 1986 a meeting of the UN Security Council was held at the request of the League of Arab Nations, at which an appeal was again heard for the most rapid possible end to the war between Iran and Iraq. From whatever aspect one examines this conflict it is clear that it not only is bringing calamity and suffering to the peoples of the two countries, but is also a serious destabilizing factor in the region.

According to Western specialists, in the last two years neither of the warring sides succeeded in achieving an important strategic success, although many military campaigns during this period pursued decisive goals. In particular, having exhausted the operational-strategic reserves created to carry out offensive operation (Khyber) (begun at the end of February 1984*), and suffering substantial losses (approximately 20,000 men), the Iranian forces were able only to consolidate on the lines achieved and were forced to shift to the defense. However, the Iranian command, having assessed the results of this operation as an undoubted success for its forces, began to prepare a new large-scale offensive, having again concentrated primary attention on the southern sector of the front.

During spring and summer 1984 combat operations were mostly positional in nature. The two sides restored the combat effectiveness of their large units and units, which had suffered heavy losses, and prepared for new battles.

The Iranian command strengthened the grouping of its troops in the southern sector of the front, through newly activated large units and units of the "Corps of Guardians of the Islamic Revolution" (KSIR) [Revolutionary Guards], as well as by sending to the front new contingents of ("Basidzh") reinforcements. Simultaneously, measures were taken to create human reserves, supplies of ammunition and other material and technical means necessary for carrying out the next major offensive. Large units and units, most of all those located in the southern sector of the front, were replenished with weapons and military equipment, mainly purchased secretly abroad.

The Iraqi command, having guessed the enemy plan, strengthened its defense and prepared to repulse the new offensive. Exploiting its superiority in aviation, during this period it employed the tactic of making systematic air strikes against positions and concentrations of Iranian troops, arriving reserves, major control posts, communication centers, lines of communication and depots.

Difficulties in the material-technical support of the Iranian troops and active Iraqi air operations disrupted the timing of preparations for the Iranian offensive. To a significant degree this also resulted from the intensified contradictions between the commands of the regular Iranian armed forces and of the Revolutionary Guards, due to the substantial advantages which the Revolutionary Guards had in rights and privileges, as well as in material and financial support, compared to the cadre army. As a result, the most favorable time period in terms of weather conditions to begin the offensive in the southern sector of the front in 1985 was lost. In this situation the Iranian leadership, in order to maintain the required intensity at the front and confuse the Iraqi command about its main plans, on 17-18 Oct 84 prepared and made a diversionary strike against Iraqi troops in the central sector of the front in an area located 50-60 km southwest of Ilam (Figure 2).

During these battles the Iranian troops succeeded in knocking back advanced screening forces and penetrating 1-3 km into the enemy defense, seizing several tactically advantageous hills. However, their further advance was stopped by counterattacks of Iraqi ground forces and active air operations. Suffering significant losses, the Iranian forces lost their offensive fervor and were forced to shift to the defense on the lines achieved. This limited offensive in the plans of the Iranian command was code named Operation (Ashura) and was the last attempt to step up combat operations at the front during the 1984 campaign.

Compared to the previous year, 1985 was more filled with different events and, as Western military specialists noted, represented a qualitatively new stage in the development of the armed conflict between the two countries.

In January 1985 the Iraqi command made a number of limited spoiling strikes against Iranian forces preparing to attack in the southern sector of the front and the central sector (in the area of Qasr-e Shirin.) As a result, the Iraqis succeeded in disrupting the stability of the enemy defense in several sectors and crimped it somewhat. All of the Iranian attempts to restore the lost positions were unsuccessful. On 12 February Iraqi troops again made two limited strikes in the central and southern sectors of the front, in the areas of (Seyf-saad) and the (Madzhnun) Islands respectively. However, the Iranian command succeeded in repulsing the enemy attempt to expand the previously seized bridgehead on the (Madzhnun) Islands and on the other strike axis achieved tactical success and seized a number of commanding heights in the security zone of the Iranian defense.

Through these strikes, as well as the active effects of heavy artillery and air, the Iraqi command noticeably reduced the combat effectiveness of the enemy strike groupings and forced him once again to shift the time for the start of a new offensive.

Disputed territory on the Iran-Iraq border

Figure 2. Main areas of combat operations of Iranian and Iraqi forces

The major Iranian offensive operation in the southern sector of the front, which had been in preparation for a year, began only on 12 Mar 85. It received the code name Badr. Having concentrated substantial forces here, the Iranian command made a strike, like in February 1984, from the area of the (Madzhnun) Islands in the Khor-el-Khoveyze swamps (Figure 3) in westerly and northwesterly directions. The objectives of this operation, judging by reports from Western information agencies, were to cross the Tigris River, cut off and defeat the Iraqi troops and seize vast areas in Iraq.

The Iraqi command, which had long anticipated this offensive, transferred the necessary reserves and, through powerful flanking counterstrikes, cut off the enemy attack grouping and then defeated it with intensive artillery and air power. Having lost, as the SUNDAY TIMES reported, up to 30,000 personnel and a substantial amount of military equipment between 12 and 18 Mar 85, the Iranian command was forced to withdraw its battle-weakened troops to their attack position. Military operations at the front again became positional.

This period is known as the "war of the cities" (the term was widely used in the Western press). In response to the shelling of Basra and other frontline cities by Iranian artillery, Iraqi aviation made a series of missile and bombing strikes against important Iranian political and administrative centers. For its side, the Iranian leadership sanctioned the shelling of the capital of Iraq with operational-tactical missiles. Overall, between March and June 1985 14 such missiles were fired against Baghdad. In May of that year the Iraqi military and political leadership decided to resume air and missile strikes against administrative and economic targets deep within Iranian territory including Tehran. From 26-29 May alone Iraqi aviation carried out nine attacks against Tehran. The Iranian cities of Ahvaz, Kermanshah, Tabriz, Esfahan, Merivan, Shiraz and others were also subjected to bombing and missile strikes.

Attempting to disrupt the export of Iranian oil and deprive Iran of sources of currency needed to continue the war, and force her to cease combat operations at the front, beginning on 15 Aug 85 the Iraqi command sharply increased the air strikes made against the most important Iranian petroleum exporting ports, its shelf oilfields and oil-loading ships in the Persian Gulf. Iraqi aviation made more than 120 strikes against the main Iranian oil exporting port on Khark Island alone. In response to this, from September 1985 Iranian naval forces began regular inspections of all commercial vessels moving through the Strait of Hormuz, to find and confiscate military goods intended for Iraq.

Having not achieved its assigned goals and having suffered a serious defeat in Operation Badr, the Iranian armed forces command, as the Western press noted, did not refrain from implementing subsequent plans for the 1985 military campaign, although it did somewhat re-examine them. The losses suffered did not shake the resolve of the ruling Iranian clergy to continue this senseless, fratricidal war "to a victorious end," although the Iraqi leadership repeatedly made peace proposals about a political settlement of the protracted conflict.

To demonstrate its inexorability and retain the initiative, the Iranian command decided to maintain highly active military operations across the full

extent of the Iran-Iraq front, by making strikes limited in scale, missions and resources involved. According to its calculations this tactic was to wear down the Iraqi troops, shatter their defense and exhaust Iraq's resources, in order to create favorable conditions for a large-scale offensive operation.

In accordance with this plan, from April through December 1985 Iranian troops made more than 40 limited strikes (with from one battalion to three brigades) on various sectors of the Iran-Iraq front. In areas north of Rawanduz and south of Mehran, as well as on the (Kutel-Amar) Axis they succeeded in achieving certain tactical successes and penetrated from 2-10 km into the Iraqi defense. Overall, there were no substantial changes in the positions of the two sides as a result of these operations in 1985.

In parallel with the limited strikes, the Iranian leaders continued preparations for a large scale offensive operation in the southern sector of the front, paying particular attention to its all-round support. Individual elements of the forthcoming offensive were worked out during two joint exercises of large units and units of the regular forces and Revolutionary Guards.

The Iraqi command, repulsing the limited enemy strikes, improved its defensive system and took steps to create required reserves in case large scale combat operations on the front resumed. In a number of instances it made pre-emptive strikes against Iranian troops preparing for the offensive.

Having completed careful preparations by the end of January 1986, the strike grouping of Iranian troops concentrated along the Shatt Al Arab, on the night of 9-10 February, shifted to an attack in the southern sector of the front. It numbered more than 100,000 men. The offensive, which received the code name (Val Fadzhr-8), began from the area south of Khorramshahr. Exploiting surprise and the darkness of night, forward units crossed the river in several places on previously prepared crossing equipment, seized a bridgehead on its western bank and made ponton bridge crossings. Simultaneously a strike was made from the Khorramshahr area toward Basra. However, on this axis the Iranian units were not successful. Having fallen under strong Iraqi artillery fire, they were forced to withdraw to their attack positions, suffering significant losses.

In the area south of Khorramshahr the Iranian troops were able to use the crossing sites to concentrate their main forces on the bridgeheads which had been seized, and they began to develop the offensive in the direction of Fao. The next night the Iranian command transferred additional reinforcements to the attacking troops by sea, including artillery and tanks. On the morning of 11 February, in coordination with an air assault made at dawn west of Fao, they seized this city. Subsequently the offensive developed in northerly (toward Basra) and westerly (toward Umm Qasr) directions.

The Iraqi command, having moved additional reserves into this area and making a number of frontal counterstrikes during 12-14 February, was able to halt a further enemy advance on a line 8-10 km north and northwest of Fao. However, it was unable to completely knock him from the seized Iraqi territories. Stubborn fighting continued here until virtually the end of the month. The

troops on both sides repeatedly shifted to counteroffensives, but neither was able to achieve substantial success. The sides suffered heavy losses. Thus, according to a report by an organization of mojahedin's of the Iranian people, a group opposed to the Khomeini regime, which was published in Paris, in the first three days of the battles alone Iran lost approximately 24,000 men, of whom almost 7,000 were killed. Overall, during Operation (Val Fadzhr-8), according to Western specialists their losses constituted up to 50,000 men killed and wounded. The Iraqis also had substantial human losses.

The frequent rains and fogs in the area of the battles did not allow the Iraqi command to make effective use of aviation, just as the very swampy terrain prevented the massed employment of heavy weapons, which virtually deprived the Iraqi army of its primary advantages. Under these conditions, the country's military and political leaders decided to cease further attempts to liberate Fao and the troops on both sides shifted to the defense, consolidating on the lines achieved.

On the night of 25 February Iranian troops began an attack in the northern sector of the front, striking in the direction of Bane and Sulaymaniyah. During this offensive, code named (Val Fadzhr-9), they succeeded in seizing a number of hills and several enemy company strong points. Having carried out a regrouping of its forces, the Iraqi command made counterstrikes from areas east and northeast of Sulaymaniyah and basically restored the lost positions. Subsequent attempts by Iranian troops to resume the offensive were unsuccessful and in early March the battles in this area also became positional in nature.

Operation (Val Fadzhr-9), in its scale and in the number of forces which took part, was much smaller than the previous operation (Val Fadzhr-8) and was assessed by Western military specialists as a diversionary attack, carried out to divert the attention of the Iraqi command from the southern sector of the front and to weaken the enemy onslaught in the south, by having pinned down his reserves through the more active combat operations in the north.

Assessing highly the successes achieved in the February offensive operations, the Iranian military and political leadership officially declared its intention to complete the destruction of Iraqi troops and, by the end of the current Iranian year (March 1987) achieve a final military victory over Iraq. The country declared a state of virtual universal mobilization and began preparations for a new decisive offensive.

In order to disrupt Iran's preparations for its next major offensive, the Iraqi command sharply picked up combat operations at the front. During April and the first half of May 1986 it prepared and carried out a number of offensive operations in various sectors of the front in areas east of Mandali (April) Abu-gurab (April-May), Fuka (April), Mehran (May) and in the direction of Rawanduz to the Shinak Pass (April-May). As a result, Iraqi troops succeeded in breaking through the enemy defense, seizing some sectors in his territory and occupying the city of Mehran. All Iranian attempts to restore the lost positions and change the situation in their favor were unsuccessful. Simultaneously, Iraqi aviation increased its missile and bombing strikes

against major Iranian administrative and industrial centers, and in first priority against important military and economic targets.

Not reconciled to its lost tactical initiative, on 1 Jul 86 the Iranian command attacked in the central sector of the front in the area of Mehran and liberated it as a result of stubborn battles. In September a strike was made in the northern sector of the front from the area of (Piranshekhr) in the direction of Rayat and Rawanduz, and the Iranian troops achieved some success. They seized a number of tactically advantageous hills on Iraqi territory.

Overall, Western military specialists believe that combat operations on the Iran-Iraq front were distinguished in 1986 by rather high activeness and large scale. As a result of the seizing of the Iraqi city of Fao by Iranian troops early in the year, a dangerous threat was created that they would break through to the important Iraqi naval base of Umm Qasr and reach the border of Kuwait.

Such a development of events could have led to the disruption of the main lines of communication linking Iraq with the Persian Gulf Arab states from which it obtains aid necessary to continue the war, which would seriously complicate Iraq's strategic military position. The danger that Iranian troops would reach the borders of Kuwait caused, as the Western press noted, deep concern on the part of the leaders of a number of Arab states, who not without justification viewed Islamic fundamentalism and the officially proclaimed program of the Iranian clergy to export the "Islamic Revolution" as a direct threat to their existing regimes.

At the end of December 1986 the Iranian command undertook a new offensive in the southern sector of the front. To make the strike six divisions, six separate brigades, units and subunits of special troops, as well as various Revolutionary Guards formations (the latter numbered approximately 50,000 men) were concentrated here. Iraqi intelligence, as the foreign press reports, disclosed in a timely manner enemy preparations for the offensive, which enabled it to take appropriate measures.

On the night of 23-24 December Iranian troops made a strike on a relatively narrow zone (40 km across the front) and seized a number of islands on the Shatt Al Arab and bridgeheads on its western bank. According to foreign specialists these were the most bloody battles of the entire war. In only two days the attackers lost approximately 10,000 men killed.

In stubborn battles the Iraqi troops were able to halt the enemy offensive, made a number of counterstrikes, completely destroyed the grouping on Umm-er Rassas Island and seized a large number of prisoners. Their losses were more than 9,000 men killed and wounded. Thus ingloriously concluded the latest battle in the war between Iraq and Iran, which has continued for more than six years and is tragic in its ferocity, a war which has caused tremendous human losses and ravages and the destruction of material and cultural valuables.

But the war continues even today and in it inhuman actions are used such as the employment of chemical weapons and strikes against civilian targets of no military importance.

Thus, the entire course of the operations on the front shows that military means merely postpone the settlement of the contentious issues between the two neighboring countries and do not bring it nearer. The danger of further escalation of the conflict and of acute complication of the international situation in this important area remains.

The Iraqi government has already made proposals for a halt to the war and agreed to a peaceful settlement of the conflict. However, this situation does not suit the ruling circles in the U. S. and its allies in the NATO bloc. While officially having declared an embargo on the delivery of weapons to Iran, they in fact enable the Iran-Iraq armed conflict to continue, and quietly encourage private companies and intermediary firms in their countries to make backstage deals with Iran to sell the weapons and military equipment necessary for it to continue the war. Thus, in November-December 1986 new facts were published in the Western press which confirmed the interest in this on the part of American imperialism. The United States, secretly using Israel, is sending weapons and spare parts for military equipment to Iran, and the money obtained is going to expand military conflicts in other areas of the world -- the anti-Nicaraguan plans of "contras," Afghan dushman and UNITA terrorists in Angola.

The Soviet Union opposes as it always has any attempt to exploit the Iran-Iraq conflict to interfere from without in the affairs of states in the Middle East, no matter under what pretext it is made. The continuation of the conflict underscores more and more that only those who are interested in the mutual weakening of Iran and Iraq and the overall destabilization of the situation in the region benefit from the war. As is emphasized in a Soviet Government statement of 8 Jan 87, the most rapid settlement of the conflict would meet the interests of the peoples of Iran and Iraq and of all the countries of this region. It would signify an important step enroute to a general improvement in the international situation. The Soviet Government is prepared to assist in any way possible any honest and constructive efforts to shift the resolution of the Iran-Iraq conflict into peaceful channels.

To halt the continuing slide to the danger point and extinguish this center of military confrontation and not allow it to widen is a truly urgent task for all peace loving states. Under the false pretext of defending their "vital interests," powers located many thousands of kilometers from this area are sending here their warships, establishing special commands, conducting exercises of "rapid deployment forces" and threatening the security of countries located here.

9069
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OUTPOSTS OF AGGRESSION AND ISRAELI EXPANSION

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 19-22

[Article by Col Yu. Sedov: "Outposts of Aggression and Israeli Expansion"]

[Text] The Israeli settlements created on the Arab lands occupied as a result of the 1967 aggression (the western bank of the Jordan, the Gaza Strip and the Golan Heights)* are considered to be the main instruments of Zionist policy for the colonization of those lands. Their nature confirms the expansionist, predatory goals of Tel Aviv policy, which are aimed at predetermining the future borders of the state of "Great Israel" and, through policy of "fait accompli," forcing the international community to acknowledge them. It is no accident that Gen Ariel Sharon, when he was minister of defense, called the settlements the "forward line of the defense of the country," having noted cynically that they guarantee the rights of the occupiers more than any declarations or signed agreements.

Tel Aviv distinguishes the settlements erected on the occupied Arab lands as military and civilian. Since both in the final analysis served the goals of expansion and may be used as outposts to carry out aggressive acts, the press usually calls them militarized. Emphasizing the militaristic thrust of the policy under which they were created, the Palestinian journal (AL-ARD) noted that the settlements are being built under the direct control of the general staff, and that the so-called "needs of defense" have decisive influence on the selection of their locations.

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*The western bank of the Jordan River (Israel officially calls this area by its Biblical names of Judea and Samaria) and the Gaza Strip have been Palestinian territories from time immemorial, which, in accordance with UN General Assembly Resolution No 181 of 29 Nov 47, were to enter a Palestinian Arab state. Pursuant to this same resolution, Jerusalem obtained international status. After to 1948-1949 war the West Bank was transferred to the temporary control of Jordan, and the Gaza Strip to Egypt. The Golan Heights are part of Syrian territory.

The military settlements are being erected in places adjacent to the territories of neighboring Arab states , at forks in major roads, on commanding heights; i.e., in places where it is considered necessary to establish control over militarily important areas. They are being created according to plans of the Ministry of Defense and are being prepared for use as strong points. The civilian settlements are of two types: kibbutzim (collective, communal farms) and moshavim (individual farms, which use collective methods of working the land and selling the products). The number of residents in each fluctuates from 100 to 2,000.

The majority of the settlements are being created by subunits of the territorial forces NOKhAL ("Fighting Youth"), which are part of the ground forces. First of all NOKhAL recruits engage in initial military training for several weeks (the term of service for men is three years and for women is two). Then they are sent for one year to continue their service in some settlement, as a rule of the kibbutzim type, where along with military training they fulfill economic tasks. It is believed that here they receive sufficient experience and then can accomplish independent tasks of creating settlements. After the completion of service, approximately half of the service personnel in the territorial forces remain to live permanently in the settlements. This is encouraged in every possible way by the Israeli government.

The settlements are surrounded by high walls and rows of barbed wire; guard towers are erected at the corners. Minefields are created around these "hornets' nests," artillery pieces are set up on the sides of the roads and combat patrols and ambushes are sent out. Firing positions and shelters are erected in the settlements and there is a two week supply of ammunition, food and water.

A corresponding organizational structure is created based on the settlements, writes (AL-ARD), which constitutes the so-called regional defense system. A group of settlements located close to one another forms a military sector, the leadership of which in peacetime is responsible for training the personnel and ensuring security. If military actions arise the formations of settlement residents must take an active part in them. Several sectors form a main military sector. All are subordinated to the command of the military districts, at the headquarters of which the position of regional defense liaison officer has been established. It also has a representative at the general staff.

Overall, on the West Bank (more than half of its territory is under control of Tel Aviv) live more than 50,000 Jewish settlers (not counting the residents of Jerusalem) and approximately 1,000,000 Palestinian Arabs. In the Gaza Strip, which is a 42 km long and 10 km wide zone along the Mediterranean Sea, approximately 2,000 Jews have settled. The local population in the sector is 550,000 Arabs. Israel has conferred upon itself a third of this territory.

The Golan Heights is a plateau 67 km long and 24 km wide which rises above the northwestern part of Israel. As a result of the 1973 war the Syrians succeeded in crimping the enemy, but he still retains two-thirds of the province of Kuneitra. Abandoning the center of the province according to the

troop separation agreement, the occupiers destroyed everything there that had not been previously destroyed. From 1974, by the same agreement, Syrian and Israeli subunits divided the zone, in which UN troops are located. Before the Israeli invasion of the Golan Heights more than 160,000 people lived there; now 10,000-15,000 remain. The aggression wiped from the face of the earth approximately 200 Syrian villages. The interventionists, using the most barbarian methods, are forcing the majority of those indigenous residents remaining in the occupied zone to abandon the area.

On maps published in Israel three-quarters of the West Bank territory is designated as "of importance to the security of the Jewish state." In fact, this terminology is used to conceal the true nature of Tel Aviv's policy, which under the pretext of "ensuring security" has unleashed five major wars in the Middle East and carried out a tremendous number of aggressive acts against the Arabs. According to the fair expression of the well-known Israeli lawyer F. Lander, the Zionist settlements on the occupied territories are "a spring-board for an attack on the Palestinians and a knife in their heart."

Construction of the settlements, which in Israel are called the "eyes, ears and roots" of the country, is being carried out on the West Bank in three directions. The first chain passes along the Jordan River and isolates the Palestinians living there from Jordan. The second lies along the truce line established in 1949 between Jordan and Israel, the so-called "green line." It separates Palestinians living on the West Bank from Israel. The third chain rings such major Palestinian cities as Nabulus, East Jerusalem and Janin.

The quarterly journal PALESTINIAN STUDIES, published in Washington, in analyzing the geography of the placement of the settlements, directs attention to their concentration around the main centers where the Palestinians live. This pursues the objective of isolating the Arab population, putting it under firm control and creating for it an unendurable economic and psychological situation. As a result, from 1967-1984 more than 100,000 Palestinians left the West Bank. In recent years approximately 12,000 people emigrate from there annually.

The road network unites the Israeli settlements, but bypasses the Arab populated areas and splinters and separates the areas in which the Arabs live. In the coming years it is planned to build 550 km of new east-west roads on the West Bank (distinct from the already existing north-south system), which will tie the infrastructure of the area to the overall infrastructure of Israel to a still greater degree.

Special attention is being paid to strengthening the network of settlements around Jerusalem. As is known, following the 1948-1949 war Jerusalem was divided into two parts -- the western part, which was seized by the Zionists and the eastern part which came under Jordan's control. In 1967 Israel also occupied East Jerusalem, and in 1980, in violation of the norms of international law and UN resolutions, declared all of Jerusalem its eternal and indivisible capital. At present approximately 20 settlements have been created in this area, which cut off the eastern part of the city from the remaining Arab territories. Twelve nearby Arab villages were wiped from the face of the earth.

against the Palestinian population speaking out for national self-determination and the creation of its own independent state. In only two years (1983-1984), more than 40 outposts of aggression and expansion arose on the West Bank. Overall, at the end of 1986 the number of settlements completed and under construction on occupied Arab lands exceeded 220.

The United States is a direct participant in the aggressive and expansionistic acts of Tel Aviv, including the "creeping annexation" of the seized territories. The CIA notes in one of its reports that even if the billions of dollars which Israel receives from the U. S. are not being used directly to create militarized settlements, they enable Israel to free her own funds for these purposes. U. S. President Reagan has stated repeatedly that Israeli settlements on the occupied territories cannot be assessed as "obstacles on the path to peace" in the Middle East. In recent years Tel Aviv's colonization policy is becoming more and more openly annexationist in nature. Whereas previously Arab lands were confiscated for compensation and, according to the official version, "for temporary use," in 1980 all land for which the ownership could not be proven was declared state land;" i.e., free for the construction of settlements. As a result of the entire network of legal obstacles created by the Israelis, it is an exceptionally difficult matter, frequently hopeless, for Palestinians living on the land to prove their right of ownership.

As a result of this change in Israeli policy, in 1982 the so-called "Drobles Plan" came to light. This plan provides for the requisition of all "unworked land" and the building of settlements between Arab villages to impede the expansion of the latter. In the words of the Swiss newspaper (NEUES ZURICHER ZEITUNG), the main goal of this "strategy of encirclement" is to "nip in the bud the emergence of a Palestinian formation." In the future it is proposed to create blocks of settlements which as they are knitted together will turn into small city centers.

"The very existence of Israeli settlements on the occupied territories," writes the well-known Israeli public figure (I. Shahak) "is a violation of the most basic human rights and international laws. The settlements have been created for the sake of expansion and in order to hold the local population permanently in enslavement. The Israeli settlements are a source of discrimination, racism and oppression." They have turned into true breeding grounds of a racist-religious theory of superiority of Jews and of the rightness of their rule over the "natives."

The emergence of Jewish territorial organizations has become the logical consequence of the policy of the occupation of Arab lands and their intensive colonization. It is precisely from the midst of the settlers that underground extremist groups are forming, which are committing vicious crimes. In particular, the ultra-reactionary religious group (Gush Emunim) (Union cf Believers) has arisen as a Zionist movement for the colonization of the occupied territories. At present, notes THE JERUSALEM POST, it is a powerful professional and well financed organization, which enjoys the support of many Israeli parties. (Gush Emunim) served as one of the primary moving forces in Israel, which is participating in the creation of the militarized settlements. Its members operate primarily by methods of terror and force, attempting to

sow fear in the Arabs and force them to abandon their birthplaces. Deeds of their hands include pogroms in Arab villages, assassinations of the mayors of Arab cities on the West Bank, shellings of Palestinian peasants, butchery of students at the Islamic university in Hebron and attempts to blow up Muslim holy things and mosques in the Arab part of Jerusalem and in other cities. The activity of (Gush Emunim) is clearly fascist in nature, states (Z. Karkabi), candidate member, Central Committee Politburo, Communist Party of Israel, "an organization which unites fanatic colonists on the occupied territories. It openly threatens civil war if the government, no matter who is in power, agrees to give back even an inch of the seized land. And this is not an empty phrase. (Gush Emunim) has its own armed detachments, is organizing underground groups and is creating a security service independent of the occupation administration.

In the police stations thousands of statements have accumulated from Arabs, whom such groupings have threatened with reprisals. Extremists are burning growing crops and agricultural structures of the Palestinians, damaging citrus orchards and breaking water supply pipes. Fascist Zionists commit outrages on the occupied territories virtually with impunity, feeling themselves to be a "second power" here.

A special UN Security Council commission, having examined the situation in the occupied Arab territories, underscored the unintentional, systematic and large scale nature of Tel Aviv's settlement policy, which has led to abrupt negative economic and social changes in the daily lives of the Arab population. It has resulted in changes of a geographic and demographic nature in the occupied lands, including Jerusalem. These changes, the commission report notes, are in violation of the 4th Geneva Conference and of corresponding decisions made by the UN Security Council. It is leading to major displacements of the Palestinians and the loss of their property and is increasing still more the number of refugees, with all attendant consequences. Summing up its investigation, the commission expressed the conviction that the Israeli policy of creating settlements is absolutely unlawful and is leading to the exacerbation of the situation in the Middle East.

The question of the Israeli settlements is an important component of the entire complex of problems of a Middle East settlement. If Israel, supported by the United States, refuses to eliminate these outposts of expansion and breeding-grounds of racism and to withdraw its troops from the Arab territories occupied in 1967, and carries through to their complete annexation, then the position of the Soviet Union will be aimed at all-round support of the just Palestinian cause. Our country proceeds from the fact that the inalienable right of the Palestinian people to self determination and to the creation of their own state on Palestinian land, which will be liberated from Israeli occupation -- on the West Bank of the Jordan River and in the Gaza Strip -- must be supported in practice. The Palestinian refugees must be granted the opportunity to return to their homes or receive appropriate compensation for the property they abandoned. The Soviet approach envisions returning the eastern part of Jerusalem to the Arabs. Naturally, all of these proposals can be realized only if the Israeli militarized settlements are eliminated.

In order to get the matter of a Middle East settlement moving, the Soviet Union has proposed that a preparatory committee with the participation of all the permanent members of the UN Security Council be created to convene a peace conference. USSR policy is a concrete manifestation of its constant desire for normalization of the situation in the Middle East, the establishment there of peace and quiet and the curbing of the aggressive expansionist designs of imperialism and Zionism.

9069
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MILITARY TRAINING IN THE U. S. ARMY

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 23-28

[Article by Col Yu. Groshev, candidate of military sciences: "Military Training in The U.S. Army"]

[Text] The U. S. Army command, which is actively carrying out a policy of building up the military might of its forces, pays much attention to military training as one of the main components of their combat readiness. It believes that capable actions by commanders and personnel on the battlefield and their high degree of professionalism may compensate for the advantage of a superior enemy and facilitate accomplishing the assigned missions. The guarantee of this is the high quality of training of military personnel which, in the opinion of American military specialists, is based on the procedure under which the forces are manned, the structure and content of military training, and monitoring and assessment of its quality.

Manning of the U. S. Army. Since 1973 the Army has been manned primarily according to the so-called voluntary principle; i.e., by hire. Men and women from 18 to 35 years of age are accepted for service. The minimum term of the contract for enlisted personnel is three years. At the same time, the law on military obligation has not been abolished. It is employed in case of emergency, and also extends to all specialists who are not among the volunteers. Candidates undergo medical, social, psychological and physical selection. Persons accepted as suitable for military service are enlisted in the Army and sent to training subunits.

Structure of Military Training. Military training in the U. S. Army includes training personnel in training centers or in courses for new enlistees in military schools of the branches of arms (services), and the training of personnel of subunits and units.

Training centers are intended for individual training of service personnel, as well as for actions as a member of a squad, crew or team. Training at these centers takes place in two stages: initial military training* and advanced individual training.

The initial stage (eight weeks) is mandatory for all new enlistees, regardless of the nature of their subsequent service, and is carried out according to a common training program. It consists primarily of moral and physical training of service personnel, imparting to them necessary knowledge and skills for actions on the battlefield, etc. It is divided into three training periods. During the first period the soldiers are familiarized with the fundamentals of military legislation and military discipline, exercises on drill and physical training are carried out, weapons of mass destruction and protection against them are studied and the soldiers learn military etiquette and the rules for wearing the uniform. The new recruits pass through initial adaptation to the army environment. In the second period primary attention is paid to weapons training. Personnel study the theory of firing and the nomenclature of weapons, and they acquire skills in operating them. At the end of this period the students accomplish two record firings from the M16A1 rifle (day and night). In the third period tactics of a soldier on the battlefield and his use of weapons are studied, and practical exercises are conducted on the ground with live firing.

The main subjects in the initial training stage are tactics, weapons firing and physical training. The personnel also study regulations, reconnaissance techniques, engineer matters, military topography, hygiene and first aid. In this stage much attention is paid to ideological and religious processing of the new recruits in the spirit of anti-Sovietism and anti-communism. Exams are taken at the end of this stage of training.

Field training of the new recruits is tested on a strip of terrain approximately 3,200 meters in length. In their actions there the students must: negotiate obstacles and barriers; destroy Target No 1 ("enemy sniper") by automatic weapons fire; maneuver and close with the "enemy" and destroy Target No 2 (machinegun) with a grenade; give first aid to a "wounded" soldier; disassemble and assemble weapons; and by individual fire from a foxhole destroy targets within a wide arc of fire at distances of 15 to 250 meters.

Additional exercises and a second exam are organized for personnel who receive unsatisfactory marks. Persons who do not fulfill the exam requirements after additional exercises again go through the complete program of the initial training stage.

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*The U. S. Army has also approved a program of initial training of new enlistees which provides for their training in one training center and within one training subunit. This is being conducted most intensively at Fort Benning. (For more detail see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, 1984, No 4, p 36. -- Ed.)

Personnel who have successfully passed the exams and acquitted themselves well are sent to the training centers, courses in military schools of branches of arms (services) or to courses in regular army units and subunits for advanced individual training (according to their military specialty).

This training (six to eight weeks) encompasses a system of theoretical knowledge and practical skills necessary for subsequent service. For infantrymen and tankers the main subjects are considered to be tactics, firing training, technical training and driving combat vehicles. During the final seven days squad (crew) level field exercises are conducted under conditions as close as possible to those of combat. They conclude with exams and a day-long tactical exercise with live firing. After this the soldiers are sent to troop units.

Military training in army units and subunits is planned for a training year, which in the U. S. Army begins on 1 July and concludes on 30 June of the next year.

The training year is divided into four periods. In each period 60 days (480 hours) are allocated to military training; in a month 20 days (160 hours); in a week 5 days (40 hours) and 8 hours per day. During the entire training year military training occupies 240 days (1,920 hours).

Military training is continuous throughout the year in the U. S. Army, since the process of the arrival of a new contingent of soldiers in the large units, units and subunits, and the discharge of those whose term of contract or service has expired, goes on continuously. It includes training of the servicemen both individually and as subunits (according to American terminology, individual and collective training -- Yu. G.).

The former consists of consolidating, maintaining at the necessary level, restoring and improving the knowledge, abilities and skills of individual soldiers who have been trained in the training centers (or the courses for new recruits). The latter constitutes a process of engendering military cohesiveness in the subunits and units for waging combat operations in modern warfare.

In the opinion of American military specialists, the structure of military training defines collective training as the foundation. For this form of training 144 days (1,152 hours or 60 percent of all the training time) are allotted per year; 36 days (288 hours) per quarter; 12 days (96 hours) per month; 3 days (Tuesday, Wednesday and Thursday) per week, which are not occupied by other measures. For individual training 72 days (576 hours or 30 percent of the training time) are allotted per year; 18 days (144 hours) per quarter; 6 days (48 hours) per month and 1.5 days per week. One half day per week is allocated for maintaining weapons and equipment, periodic technical servicing, various competitions, medical service and other measures.

Military training in the U. S. Army consists of tactical, airmobile, antitank, firing, technical, reconnaissance, engineering, physical, drill, medical and communications training, protection from weapons of mass destruction, military

topography, as well as driving combat vehicles. A substantial amount of attention is paid to ideological processing and religious indoctrination of the soldiers.

The topic of tactical training encompasses all types of military actions, including under special conditions: the attack, defense, march and meeting engagement, holding actions, withdrawal, negotiating security zones, city fighting, reconnaissance, combat against air assaults, night combat, anti-guerrilla warfare, etc.

The Army command considers holding actions, when a higher degree of troop activeness must be displayed, to be one of the complex types of combat. Up to 30 percent of the time allocated to tactical training is planned for working out these matters.

An important place in tactical training is given to conducting military operations in large populated areas. During such lessons soldiers study types of populated areas, the most characteristic street plans and residential structures, building designs, special features of city utilities, etc. Practical exercises conducted at specially equipped training fields pursue the goal of developing in the soldiers the ability to wage military operations in populated areas with the use of engineer equipment. Much attention is paid to organizing close coordination along subunits of different branches of arms.

The military training plan provides for training subunits and units to wage combat operations at night and under conditions of limited visibility. It is believed that when these factors are disregarded they may have substantial influence on the course and outcome of combat. The U. S. Army has placed the greatest stress on company and battalion level subunits in this type of tactical training. Exercises are conducted primarily in the field with the use of night vision devices. It is also recommended that individual topics planned for daytime be organized under night conditions.

When studying topics concerning combating enemy tactical air assaults primary attention is paid to mastering enemy combat tactics, his methods of conducting air assault operations, special features of tactics of assault operations in rear areas and techniques of offensive and defensive assault operations. Observing the air enemy and notifying friendly forces; inculcating valuable skills of firing against air targets; setting up obstacles in areas of probable assault drops (landings) and camouflaging them; preparing positions on the routes of approach to the objective which the assault is to attack or seize, etc., are also accomplished.

These questions are studied by the soldiers in lessons and worked out in practice in the field at the subunit level. American military specialists emphasize that all soldiers, regardless of their branch of arms (service) must be trained to combat enemy assault operations.

Questions of organizing and conducting so-called anti-guerrilla warfare are mandatory elements of the tactical training plan. Techniques and methods of

operations to suppress national-liberation movements and to render "assistance" to U. S. satellites and reactionary regimes in maintaining internal political stability are studied.

In accordance with the requirements of the training program, airmobile training must be conducted in accomplishing any tactical mission. It is emphasized that under modern conditions this is placed at the forefront, especially since the new concept of the "air-ground operation (battle)" has been adopted in the U. S. Army. Soldiers study the tactical and technical specifications of helicopters and transport aircraft which are in the inventory, safety measures, methods of readying equipment and transportation, techniques of disembarking from helicopters (by ropes, ladders, etc.) and firing from the air. In the process of military training the soldiers (primarily from platoon to battalion) study airmobile operations in virtually all types of combat, as well as under special conditions (at night, in populated areas, mountains, deserts, etc.).

The foreign military press reports that since 1980 mandatory study of parachute matters has been introduced into the training process for all Army military personnel. They study parachute equipment, equipment for emplaning and making assault landings, conduct ground training and make five parachute jumps from the C-130 aircraft, day and night. Servicewomen and officers accomplish parachute jumps on a voluntary basis.

Antitank training has the mission of training soldiers to combat armored targets on the battlefield. During training the soldiers are familiarized with models of enemy military equipment and their vulnerabilities; study the antitank weapons of their subunit and learn to fire them; receive information about engineer antitank means and practice setting them up on the ground; and train on combating tanks under special conditions. When tactical tasks are worked out at the subunit level primary attention is paid to the following questions: organizing close fire coordination with subunits of other branches of arms; reliably covering the fire weapons of the subunits and assisting one another during combat when they come under enemy fire; effectively employing all weapons in the inventory of the subunits against enemy tanks; disrupting the coordination of enemy tanks with their fire weapons; splitting the enemy infantry from their tanks and the tanks from one another; selecting firing positions of antitank weapons on the ground; and conducting maneuver on the battlefield to inflict the maximum possible damage on enemy tanks. For example, when a tank platoon is operating jointly with a Tow ATGM [antitank guided missile] section in the attack (withdrawal) it is recommended that the advance (withdrawal) of one tank always be covered by another, located in a covered position or by an ATGM crew, which occupies an advantageous position to immediately open fire. The personnel of infantry subunits are trained to conduct group fire against tanks and other targets from their organic weapons to reduce the effectiveness of their combat capabilities.

Not without justification, the U. S. Army believes that the effectiveness of fire frequently has more influence on the course and outcome of combat than the number of troops and their equipment. Therefore, the closest attention is paid to firing training of soldiers in units and subunits. As with the other

types of military training the training process is divided into individual training and training of subunits. The former has the objective of consolidating the knowledge and skills gained by the soldiers in training centers, as well as acquiring new knowledge and skills, which correspond to their military specialties. The soldiers study not only their own weapons, but also the weapons in their platoon and company; they master techniques of employing them under combat situations which arise and of conducting aimed fire against fixed and mobile targets which appear under various conditions. American military specialists believe that each soldier must master with identical skill not only his rifle, but also the machinegun, grenade launcher, flamethrower and recoilless gun, and be able to employ antitank and antiaircraft missile systems.

Subunit level training is organized to consolidate and perfect firing skills and is conducted at the level of the team, crew firing group, squad, platoon, company and battalion in all types of combat, including under special conditions, day and night. The soldiers are trained to maintain close fire coordination, combine fire and maneuver, reconnoiter targets, conduct target designation and adjust fire.

The necessary knowledge in the other types of military training, besides physical training, is acquired mainly during the course of accomplishing comprehensive tasks in the main types of military training.

Physical training occupies a special place. In the U. S. Army it is viewed as an integral part of training and indoctrinating military personnel in the spirit of hatred toward the probable enemy and defense of the interests of the ruling classes. Physical exercises used in a course of training personnel are in six main groups: general strength, supplemental, negotiating obstacles, swimming, athletics and mass games. This type of training is carried out according to official and unofficial programs, and includes individual physical training and subunit level training. Individual training is conducted with the objective of achieving a high level of physical conditioning. Military exercises, running, negotiating obstacles, mass games and competitions of various types constitute the core of this program. Up to two hours per week are allotted to this in training programs in units and subunits. In the opinion of American specialists this is enough time to improve and maintain at the necessary level the physical fitness of the soldiers.

Subunit level training includes calisthentics and running. Cross-country training is conducted daily for all platoons (two miles on Mondays and Tuesdays, three miles on Wednesday and five miles on Thursday). Additional exercises are organized for those who lag behind at the end of the week. Once per month the soldiers are tested in physical fitness through the physical combat proficiency test, which includes five exercises. Once per quarter the subunits accomplish a 25-mile forced march. Recently, judging by foreign press reports, more attention has begun to be paid to applied military exercises and types of sports, and a more rigid physical education program has been introduced.

So-called individual and collective training tasks have been composed to monitor and evaluate the quality of training of soldiers and subunits. They are developed for each soldier, taking into account his time in service, training level, physical and intellectual development, inclinations, abilities and capabilities, as well as the specific military training missions accomplished by his subunit. In accordance with their requirements, each individual training task is nothing other than a list of minimum requirements for the level of training of the soldier at a given stage of his service. The foreign military press notes that a soldier who has arrived from a training center at a subunit and been through particular training should, as a minimum, fire excellently from his organic weapon, know the mechanisms of the M60 machinegun and RPG M72A2; define the signs of enemy use of weapons of mass destruction and take protective measures; know the techniques of camouflage; be able to prepare an individual foxhole; set up, remove and operate the Claymore antitank mine with electrical fuse; know the mechanism and be able to operate the AN/PRC-77 radio as well as handle the field telephone apparatus; throw a grenade 30 meters; render first aid; obtain reconnaissance information; get 300 or more points in physical training; run 5 miles in 50 minutes once a week and accomplish a 25-mile march once a quarter in less than 12 hours.

Collective training tasks define the content of collective training. They are developed for each squad (crew, team), platoon, company, battalion and brigade, depending on the training level of the soldiers and the military teamwork in one or another type of combat. Each such task is a complex of inter-related military training questions. Its basic content is one of the training discipline topics. Other parts are questions on various training subjects which are accomplished while the main part is being worked out. For example, when accomplishing tactical tasks in the field questions of reconnaissance, engineering, firing, medicine and other types of military training are accomplished.

Each question is worked out under conditions indicated in the task, which are evaluated according to established indices. In the task the starting tactical situation is depicted briefly, the training questions are enumerated, the procedure for evaluating the combat effectiveness of the subunit is defined, forces and resources involved in carrying out the exercise and required technical support are indicated. Collective training tasks are worked out by subunit and unit commanders in accordance with sample listings of training tasks set forth in the military training program. The training tasks of subunits are divided into four degrees of difficulty for assessing the results of training. Fulfilling the tasks of a particular degree of difficulty ensures the achievement of a corresponding level of training, which in turn indicates a particular degree of combat readiness of the subunits (see table).

Dependence of the Degree of Combat Readiness of Subunits on their Training Level

Training Level	Content of Training Level	Degree of Combat Readiness
No 1	Training tasks of the brigade - battalion (company - squad) for which two (one) weeks remain until completion	S-1 "fully combat ready"
No 2	Training tasks of the brigade - battalion (company - squad) for which 3-4 (2) weeks remain until reaching combat readiness level S-1	S-2 "basically combat ready"
No 3	Training tasks of the brigade - battalion (company - squad) for which 5-6 (3-4) weeks remain until until reaching combat readiness level S-1	S-3 "limited combat readiness"
No 4	Training tasks of the brigade - battalion (company - squad) for which more than 7 (5) weeks are required until reaching combat readiness level S-1	S-4 "not combat ready"

Thus, the main topics of tactical training tasks of level of difficulty three are usually attack, defense, meeting engagement, withdrawal and reconnaissance. The topics of the tasks at the second level are more difficult. For example, a battalion may work out negotiating a security zone, combating tactical air assaults, operations as part of a tactical airmobile group, and other tasks. The topics of training tasks at the first level of difficulty encompass holding actions, the night attack, city defense, air assaults, etc.

The U. S. Army believes that training in some subjects without a link with tactics may have a negative influence on improving the quality of military training as a whole. It views the organization of military training according to training tasks as one of the ways of intensifying the training process and reducing the time required to train the personnel and subunits as a whole.

9069
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SALVO FIRE ROCKET SYSTEMS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 28-32

[Article by Col M. Regentov, candidate of engineering: "Salvo Fire Rocket Systems"]

[Text] Salvo fire rocket systems (RSZO) are one of the widespread, rather effective and promising field artillery weapons in the armies of the capitalist states. Their most important attributes are considered their suddenness and high density fire, which lead to a high level of destruction in a very short period of time against area targets, both in the attack and in the defense, in virtually any weather day and night. With the appearance of cluster warheads (BCh), a volley of salvo fire rocket systems became capable of inflicting complete destruction of personnel throughout the area of distribution of the free rockets (NUR). Foreign specialists also consider the following to be positive qualities of RSZO: the ability to maneuver by fire; high mobility of self-propelled launchers (PU); reduced vulnerability to enemy artillery fire and airstrikes; simplicity of design of many models; relatively low weight and relatively low cost of production of launchers; the ability to mount in artillery units PU of one design on chassis of several types (tracked, wheeled, towed).

At equivalent calibers the warhead of a free rocket has substantially more explosive charge than an artillery round, since, as a result of the small overloads during firing (tens of units instead of several thousands for an artillery round) the walls of its casing are thin, sometimes even made of aluminum alloy.

Foreign countries consider one of the main tasks of RSZO to be combating tanks and other armored vehicles. Firing is conducted mainly from closed firing positions with cassette-type warheads equipped with shaped charge-fragmentation warhead components (BE) and antitank mines. Presently, shaped charge antitank BE that are self-guided to the target in the final sector of the trajectory are under development. In the opinion of Western military specialists, these will make it possible to combat tanks effectively before they approach the forward edge.

Free rockets loaded with antitank mines make it possible to conduct remote mining of the terrain in the shortest possible period of time on axes where tanks are expected to appear, as well as in areas of their concentration and lines where they deploy into combat formation. Sudden mining of the terrain prevents or hampers maneuver by enemy tanks and at the same time creates favorable conditions for other fire weapons to destroy them.

Foreign experts name the following as shortcomings of salvo fire rocket systems: there is greater dispersion of munitions during firing than with rifled artillery; the capability of maneuver by fire is limited as a result of difficulties in firing at short range, since the free rocket engine functions until its fuel is completely burned; in its design the free rocket is more complex than an ordinary artillery round; the weight of the VCh is a smaller portion of the overall weight of the rocket; firing is accompanied by very noticeable de-camouflaging signs -- flames and smoke; there are substantial gaps between salvos due to the need to change position and re-arm the launchers.

At present salvo fire rocket systems are in the inventories of the armies of the U. S., FRG, Japan, Spain, Israel, the Republic of South Africa, Austria and Brazil. Tactical and technical specifications are shown in the table.

Tactical/Technical Specifications of Some Models of RSZO in Capitalist Armies

Model name (country)	Caliber (mm)	# Guides	Weight of NUR, kg	Weight of warhead,kg	Maximum range,km	Mine re-arm time, min
MLRS (U. S.)	240	12	310: 258	159: 107	30-40	5-6
LARS-3 (FRG)	110	36	35	17.2	15	15
Firos-6 (Italy)	51	48	4.8	2.2	6.5	5
Firos-25 (Italy)	122	40	52.4	17.3	25	5-7
Terwel-3 (Spain)	140	40	74	21	25	5
LAR-160 (Israel)	160	36	110	50	30	10
75 (Japan)	130	30	43	15	15	15
Valkiria (RSA)	127	24	53	-	22	10
X-20 (Brazil)	180	3	120	40	25	-
X-40 (Brazil)	300	3	654	147	68	-

In the U. S. the MLRS [multiple launch rocket system] entered the Army inventory in 1981. At present approximately 140 launchers and more than 100,000 rockets have already been supplied. The foreign press emphasizes that this system will become standard in the armies of the main European NATO countries (FRG, Great Britain, France and Italy).

The launcher (12 guides) is erected on the tracked chassis of the M2 Bradley armored fighting vehicle. For firing, 240 mm free rockets are used with cluster warheads (M77 shaped charge elements or AT-2 antitank mines). The NUR contains 644 warhead components (a salvo from one launcher releases 7,728 units, which cover an area of approximately 25,000 square meters) or 28 AT-2 antitank mines. At present warheads with shaped charge warhead components

The Terwel-3 RSZO has a fire control system, means of topographic surveying and communications, as well as meteorological equipment. Initial firing settings are calculated by a digital computer. The launcher is erected by a hydraulic lifting and electro-mechanical traversing mechanism. The chassis has four hydraulic jacks.

Along with the launchers the Terwel-3 RSZO firing section includes an ammunition transport truck capable of transporting 4 containers of 20 rockets each. The launcher is loaded manually by two members of the crew. It is planned that approximately 100 Terwel-3 systems will be placed in the Spanish Army.

In Israel the LAR-160 RSZO was placed in inventory and series production in 1984. The chassis of the French AMX-13 light tank is used as the vehicular base. The launcher has two packets of 18 tubular guides each. Besides the launchers, a battery of LAR-160 RSZO includes: the Fera fire control system; ammunition transport vehicles and a truck-mounted crane for re-arming the launcher.

Packets of guides with fiberglass pipes, having dense "honeycomb" packing, fill the NUR and are sealed at the manufacturing factory. Guidance mechanisms are operated by electro-hydraulic power drives.

The artillery portion of the launcher is manufactured autonomously and may be set on various carriages (tracked and wheeled). There may be 18, 26, 36 or 50 guides.

The basic ammunition load of the LAR-160 includes NUR of four types which are distinguished by their warhead components (one of them is a cluster-type, fitted with 144 M77 shaped-charge fragmentation warhead components of American manufacture).

Judging by foreign press reports, at present firing tests of a new MAR-350 RSZO with a range of 70 km are underway. Its artillery part is also set on the tracked chassis of an AMX-13 light tank.

In Japan the 130 mm 30-tube "75" RSZO was created in the mid 1970s. The launcher is mounted on the chassis of the tracked "73" armored personnel carrier. Free rockets with fragmentation-high explosive and cluster warheads are fired. Reloading is accomplished manually.

In the Republic of South Africa the army is equipped with 127 mm 24-tube Valkiria RSZO. The artillery portion is set on the West German 2-ton Unimog high mobility truck. The packet of guides is mounted directly in the truckbed, which can be covered by a removable tent, making it possible to camouflage the launcher as an ordinary truck.

The elevating mechanism, used to guide the launcher to the angle of fire, and the traversing mechanism are hydraulic. In firing position the rear part of the launcher is hung on two hydraulic jacks. Fire control is carried out from the cab or with the use of a carried panel. An NUR with fragmentation-high

explosive warhead components containing approximately 8,000 fragments in the form of steel balls is fired. A 4-ton truck is used to transport ammunition.

The foreign press notes certain peculiarities of the design and layout decisions of the RSZO which have been created. Their launchers, as a rule, are self-propelled. The majority of modern models of launchers use a truck-

mounted crane to load previously filled packets of guides. In the most modern systems the loading device is a part of the launcher design.

Launcher guidance mechanisms are provided with electrical or electro-hydraulic power drives, which make it possible to automate the guidance process; the newest models employ devices for automatically entering adjustments into the sighting device to compensate for the inclination of the launcher on the terrain and restore gun-laying during the firing process.

Launchers created in recent years are equipped with gyroscopic sighting devices. In combination with power drives they make it possible to automate the setting of guidance angles and restore them from firing to firing. Some launchers are equipped with navigation systems for topographic surveying of firing positions.

Firing settings can be calculated with the aid of a launcher fire control computer panel. However, in the majority of cases this task is accomplished by the battery fire control system, which includes computers, as well as means of radio and wire communications with the launchers and higher control organs and headquarters.

In the opinion of Western military specialists the main directions for the development of RSZO are: increasing range; improving accuracy; enhancing the effectiveness of fire; expanding the number of tasks accomplished by RSZO and improving mobility and combat readiness.

Increasing the range is accomplished by increasing the caliber of the NUR, employing high-energy rocket fuels and using lightened warhead components. As a rule, as the diameter of the engine increases the size of the solid fuel charge becomes larger, which extends the range. At the suggestion of the European NATO partners the caliber of the American MLRS was increased from 227 to 240 mm. The range increased correspondingly from 25 to 32 km.

In another case, by reducing the weight of the warhead component filled with AP-2 antitank mines (107 kg compared with 159 kg for the warhead equipped with shaped charge-fragmentation warhead components) the range with these rockets (MLRS system) was increased to 40 km. It is being reported that the warhead currently being developed for this RSZO with self-guided warhead components will have a weight not exceeding 107 kg and an expected range of 40-45 km.

Efforts are also underway in the NATO countries to increase the specific impulse of solid rocket fuels for the NUR motor.

Accuracy is enhanced by creating warhead components of cluster warheads which are self-guided in the final sector of their trajectory; employing automated

fire control systems in the RSZO battery; using special ranging NUR; equipping launchers with automated systems for restoring gun-laying; and by improving the design and technology of the manufacture of launchers and free rockets.

The Western press reports that at present a consortium of industrial firms in the main European NATO countries and the U. S. is developing a cluster warhead with shaped-charge warhead components, which are self-guided in the final sector of their trajectory for the MLRS NUR system. It is expected that series production of such warheads will begin in the first half of the 1990s. Such a warhead is also being developed in the FRG for the LARS-2 RSZO rocket. It is believed that such munitions will increase the probability of striking a target a hundred-fold over conventional munitions.

The foreign press notes that an automatic fire control system for the RSZO battery substantially reduces the time required to prepare to open fire and increases firing accuracy through reduced aging of data about target coordinates. After instructions to strike a target are received its coordinates are entered into the computer. The fire control system indicates the launcher (one or several) that can most effectively fulfill the mission, calculates for it the setting of sighting devices and warhead component charges and transmits them by coded radio communication circuits. When necessary, firing settings can be determined by the launcher fire control computer.

The LARS-2 (FRG) and LAR-160 (Israel) RSZO batteries have the Fera system, which includes special ranging rockets, a radar for tracking the trajectories of their flight and a computer. The radar and computer are mounted on a unibody truck. One Fera system serves four launchers. Radar signal reflectors and amplifiers are mounted in the warheads of ranging NUR [free rockets]. Four rockets are fired in sequence at established intervals. The radar automatically tracks their flight trajectory. The computer compares the average value of the four trajectories with the calculated trajectory and determines the adjustments, which are also introduced into the settings of the sighting devices. Thus, errors in determining the coordinates of the target and the launcher firing position, as well as deviations in meteorological and ballistic conditions at the moment of firing are taken into account. The radar is mounted behind the launch control officer and somewhat above the launcher in line with the target. According to foreign specialists the employment of the Fera system improves the effectiveness of RSZO firing approximately 60 percent.

At present the FRG is developing a similar, more improved system with a long-range radar. It is intended that MLRS batteries in the rocket battalions of Bundeswehr regiments will be equipped with this system.

Foreign specialists believe that the use of devices which automatically enter adjustments into the sight setting to compensate for the inclination of the launcher on the ground eliminate the need for its leveling and weighing on jacks or other supports. Usually it is enough to engage the brakes on the

carriage and disengage its springs. The time required to shift the launcher from march position to combat position and back is reduced to one minute, which is very important for a RSZO, which becomes extremely uncamouflaged at the moment it fires a volley.

The dynamic load of the launcher at the time of the salvo changes its position on the ground and causes elastic vibrations in the structure, often with increasing amplitude, as a result of which the gun laying angles are knocked out of position. The use of a system for automatic restoration of launcher gun laying angles from firing to firing increases firing accuracy and reduces the dispersion of NUR during conduct of salvo fire. With this aim in mind, specialists in the FRG and U. S. recommend that half-salvos (instead of full salvos) be conducted for a number of fire missions and that twice as many launchers be involved.

In the opinion of Western experts the rectilinearity of the geometric angles of the guides and their mutual parallelism, the stability of the position of removable transport-launch containers on the vibrating parts of the launcher, and rocket manufacturing technology also affect the accuracy of RSZO. Finally, it is important to observe the required external geometric shapes of the NUR and its stabilizers, as well as to balance the weights.

Firing productiveness of RSZO is improved through mechanization of launcher loading and reloading; automation of the guidance and launch systems; employment of automated fire control systems; and use of devices to select the type of warhead components from among those unguided rockets loaded in the launcher.

Mechanization of loading is based on the use of pre-filled guide packets, truck-mounted cranes and transporter-loader cranes. According to foreign specialists, the most promising solution is a loading device which is part of the launcher design.

Expanding the Number of Combat Missions Accomplished by RSZO. This is achieved mainly by creating various types of primary and specialized NUR warheads (fragmentation, fragmentation-high explosive, shaped charge, warheads with anti-personnel and antitank mines, incendiary-smoke, illumination, chemical, ranging, training and practice warheads. To increase the effectiveness of the NUR actions at the target the majority of warhead components are cluster-type.

The mobility and combat readiness of RSZO are increased through self-propelled launchers based on tracked or wheeled high mobility vehicles; modern means of topographic surveying, high speed mechanisms for switching the launcher from march position to combat position and back; mechanization of the process of loading the launchers and automating the guns and fire control systems.

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MULTI-PURPOSE ADATS MISSILE SYSTEM

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 33-35

[Article by Col V. Viktorov: "Multi-Purpose ADATS Missile System"]

[Text] The development of the ADATS (air defense antitank system) multi-purpose missile system, which is capable of destroying both air and ground targets, was completed by the Swiss firm Erlikon, jointly with the U. S. Martin Marietta Company in 1984. Judging by foreign press reports, this self-propelled system is designed to combat high speed, low flying aircraft, helicopters, reconnaissance drones, as well as ground armored targets. It can be used for defense of both mobile and fixed targets. It has been noted that the system is capable of destroying aerial targets at ranges from 0.5 to 8 km (altitude range is 5 km), and ground targets at up to 6 km range. The minimum firing range is 500 meters.

The modular design of the system enables it to be erected on tracked or wheeled vehicles of various types. In particular, the first two experimental models which underwent range testing were based on the American M113A2 tracked armored personnel carrier. The ADATS missile system includes: eight missiles with transport-launcher containers; air target detection radars; an electro-optical module for tracking targets and guiding missiles to them; computers and other necessary equipment. The crew consists of three men: a commander, operator and driver-mechanic.

The laser-guided missile (Figure 2; launch weight 51 kg; length 2.05 meters; diameter 152 mm) has a normal aerodynamic configuration and a solid fuel motor with two operating regimes. Owing to its high maximum speed (Mach 3) it is capable of destroying at rather long ranges mobile targets which are visible for a brief period of time. The missile employs a shaped-charge fragmentation warhead (12 kg), which is capable of penetrating armor up to 900 mm thick. The fuses are of two types: a noncontact fuse is used for firing against aerial targets and a contact fuse for firing against armored ground targets.

The circular scanning impulse-Doppler radar is an improved variant of the LPD-20 radar station, developed by the Italian department of the Swiss firm Contravers. According to foreign press reports the station can operate in place and when moving and is capable of detecting aircraft and helicopters at

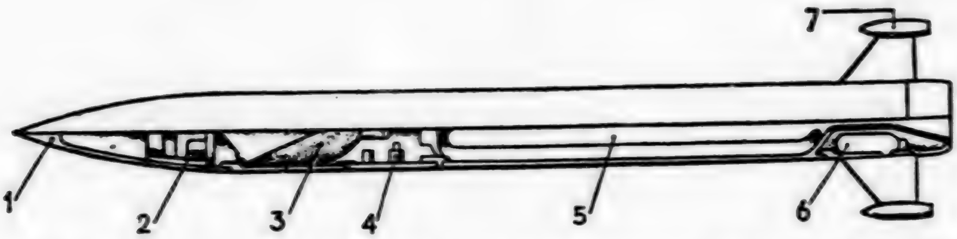

Рис. 2. Управляемая ракета комплекса ADATS: 1 — контактный взрыватель; 2 — отсек с электронной аппаратурой управления; 3 — кумулятивно-осколочная боевая часть; 4 — неконтактный взрыватель; 5 — твердотопливный двигатель; 6 — приводы рулей; 7 — приемник лазерного излучения

Figure 2. ADATS Guided Missile System: 1 -- contact fuse; 2 -- compartment with electronic guidance apparatus; 3 -- shaped-charge fragmentation warhead element; 4 -- non-contact fuse; 5 -- solid fuel motor; 6 -- homing actuators; 7 -- laser emission receiver.

ranges up to 24 km, flying at altitudes up to 6 km. Depending on the terrain relief, it detects ground armored targets at ranges up to 6 km.

The radar transmitter, which operates in the 5.2 - 10.9 GHz frequency band, operates on a traveling wave valve and has rapid tuning. A processor provides simultaneous tracking of up to six targets. The radar is combined with a "friend - foe" recognition system and projects the coordinates of the target (azimuth and range) and its nationality on a circular scanning screen. In the early 1980s the U. S. carried out evaluations of this station at Aberdeen Proving Grounds to detect helicopters at ranges of 5-18 km with an angle of elevation of the antenna beam directional pattern of 0 to 1 degree. It was reported that the UH-1H Iroquois helicopter flying at low altitudes was detected by the radar at ranges of 11-16 km with a 0.9 probability.

The electro-optical tracking module is mounted on a revolving turret between two missile assemblies. It has a gyro-stabilized platform on which an infrared device is mounted to track targets at night and in poor weather; a television camera (in good weather); a laser missile guidance system (which uses a coded beam); a laser range finder which uses a crystal of aluminum nitride garnet with an admixture of neodymium; and infrared direction finders to determine the coordinates of the missile when its engine is in operation.

As the foreign press notes, infrared and television (passive) tracking devices were chosen because they are low-weight, small in size, possess high interference resistance against electronic warfare means and good characteristics in tracking ground and low-flying air targets, and they reduce the probability that the complex will be hit by self-guided antiradar missiles. The infrared device was developed by the American firm Martin Marietta, based on the night vision system in the AH-64A Apache attack helicopter. It operates within the 8-12 micrometers range and has two fields of vision (wide and narrow).

The television device used in the ADATS system has higher resolution than the infrared device and is usually used as the main instrument for tracking ground targets. Its optical circuits are combined with a laser range finder. Passive tracking devices can also be used to detect air and ground targets when it is necessary to increase the secrecy of the military employment of the system or under conditions of strong enemy radio countermeasures.

The ADATS system operates in combat as follows. The radar detects aerial targets, data about which enter a computer for evaluation of the degree of threat and priority of fire. The results light up on the crew commander's control panel. After a target is selected for destruction the turret automatically rotates in the necessary direction and the operator locks on with the infrared or television tracking system (depending on weather conditions). The range to the target is determined by the laser range finder and is continuously adjusted during tracking.

As soon as the aerial target enters the zone of destruction a missile is automatically launched. The missile engine, operating for three or four seconds, accelerates it to a speed which corresponds to Mach 3. During this first phase of flight commands are transmitted automatically to guide the missile (Figure 4). Four infrared goniometers [direction finders] contained in the electro-optical module determine the angle of deviation of the missile. The necessary commands are worked out in the computer to guide it to the line of sight of the target, which is transmitted to the missile by pulse-position modulation of the laser beam. During this phase of guidance the energy of the laser beam is concentrated in a narrow beam in order to penetrate through the engine plume to the laser emission detectors located at the ends of the missile wings. It has been noted that the use of the command method during engine operation makes it possible to guide the missile along a trajectory close to optimal, especially when firing against targets located at short ranges.

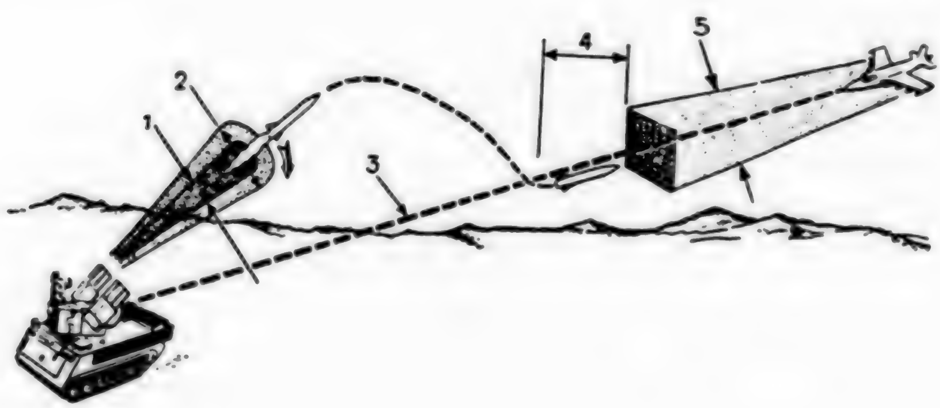

Figure 4. ADATS System Missile Guidance Diagram: 1 -- first guidance phase; 2 -- missile capture field; 3 -- sighting line; 4 -- transitional period; 5 -- second guidance phase.

After the engine fuel has burned out the second guidance phase begins, in which the same laser beam (but no longer using pulse-position modulation) is used as a guide along which the missile is aimed.

Two detectors located in the tail section of the missile receive a laser emission. The onboard computer transforms the signals into commands to the missile control surfaces, which hold it in the center of the laser beam aimed at the target. It has been noted that this method of guidance at substantial ranges provides greater accuracy than command guidance. The use of the combined guidance method in the system substantially improves firing accuracy.

Firing against ground armored targets takes place in a similar manner. According to foreign press reports a total of 39 missile launches against various targets have been made, of which 85 percent were declared successful. The first launches were made against panel board targets simulating a hovering helicopter. One of the targets had dimensions of 4x4 meters and was set up 3.4 km from the system; three others were 8 km away. In all cases hits were recorded. Firing against tanks was also conducted. Two missile launches were made to destroy tanks standing motionless at distances of three and five kilometers. One tank was destroyed while moving at a speed of 20 km per hour at a range of approximately 6 km.

In April 1986 a contract was signed to produce and deliver to the Canadian Armed Forces during 1988-1989 36 ADATS systems and 800 missiles for them. They will be used primarily in the Canadian Army forces located in Western Europe. The U. S., Netherlands, Belgium, Turkey and a number of other countries are also viewed as potential purchasers of this system.

9069
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BASIC TACTICAL NORMS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) p 40

[Unattributed article: "Basic Tactical Norms"]

[Text] MECHANIZED COMPANY OF MECHANIZED BATTALION.* A mechanized company of a mechanized battalion in a mechanized (armored) division can fight in the battalion first or second echelon, be in its reserve, or be attached to a tank battalion.

OFFENSE. The width of the company attack frontage is 1.2-1.5 km; that of the platoon is 400-500 meters and that of the squad is 100 meters. A company is assigned an immediate and a subsequent mission (objective) to a depth of 1.5-2 and 3-4 km respectively. The combat formation of the company is structured, as a rule, in one echelon with a reserve. When the enemy is attacked on foot the IFVs may be placed in a separate maneuver group, which operates up to 400 meters from the line of infantry or moves to the flank or rear of the enemy defensive position. The mechanized company may be reinforced with a tank platoon, a Stinger air defense missile crew, combat engineers and other subunits, and be supported by a battery of 155 mm self-propelled howitzers.

DEFENSE. The company defensive zone is up to 1.5 km wide and 1.1 km deep. In it are prepared platoon strong points 300-400 meters wide and 200 meters in depth. Main and reserve positions are created for the IFVs; the distance between them is 100-150 meters. During a mobile defense the IFVs may be assigned to a separate maneuver group to make counterattacks. The company combat formation is usually structured in two echelons. Attached tanks are deployed in an area in which they can provide fire support for the first echelon and take part in the company or battalion counterattack. Local protection is dispatched up to 500 meters from the forward edge.

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*The mechanized battalion of a mechanized (armored) division contains 6 companies (a total of 896 men): headquarters company, antitank company and 4 mechanized companies. It contains 54 M2 Bradley IFVs; 6 M3 armored reconnaissance vehicles; 23 M113A1 APCs; 12 M901 Tow ATGMs; 6 self-propelled 106.7 mm mortars; more than 110 trucks; almost 250 radio stations and other weapons.

Mechanized Co, Mech (Armored) Division -- U. S.

Company Cmdr

Company HQ — Mechanized Platoons (3)

Mechanized Platoons (3): Command Section — Mechanized Squads

Company HQ: commander, executive officer, 1st sergeant
Total company strength: 5 officers, 111 NCOs and enlisted

Personnel and Basic Wpns	Co HQ	Mechanized Platoon			Total in
		Cmd Sec	Mech Sqd	Total	Company
Personnel	11*	3	9	35	116
M2 Bradley IFV	1	1	1	4	13
M113A1 APC	1	-	-	-	1
Dragon ATGM lnchr	-	-	1	3	9
M203 40mm AT rkt lnchr	-	-	2	6	18
M16A1 5.56mm auto rfl	8	7	5	22	74
M60 7.62mm MG	-	-	1	3	9
M249 5.56mm MG	-	-	2	6	18
M3A1 11.43mm mchn pistol	1	-	-	-	1
radios	4	2	2	8	28

*including company headquarters

Tank Co, Armored (Mech) Division -- U. S.

Company Cmdr

Company HQ — Tank Platoons (3) (4 tanks each)

Company HQ: HQ Sec (2 tanks) — Supply Sec

Company HQ: commander, executive officer, 1st sergeant
Total company strength: 5 officers, 56 NCOs and enlisted

Personnel and Basic Wpns	Company Headquarters			Tank	Total in
	HQ Sec	Sup Sec	Total in HQ	Plt	Company
Personnel	8*	5	13	16	61
M1 Abrams Tanks	2	-	2	4	14
M16A1 5.56 auto rfl	-	3	3	-	3
M3A1 11.43mm mchn pistol	8	-	8	16	56
trucks	-	2	2	-	2
radios	3	1	4	4	16

*including company headquarters

Infantry Company, Light Infantry Division -- U. S.

Company Cmdr

Platoons

Headquarters | Infantry (3)

Sections

HQ | AT (6) | Mortar | HQ Sec | Inf Sqds

Company HQ: commander, executive officer, 1st Sergeant
Total company strength: 5 officers, 125 NCOs and enlisted

Personnel and Basic Wpns	Co HQ	HQ Platoon				Inf Platoon			Total in Company
		HQ Sec	AT Sec (ea)	Mort Sec (ea)	Tot	HQ Sec	Inf Sqd	Tot	
Personnel	3	7	2	2	25	7	9	34	130
Dragon ATGM lnchr	-	-	1	-	6	-	-	-	6
M203 40mm AT rkt lnchr	-	1	-	-	1	-	2	6	19
M224 60mm mortar	-	-	-	1	3	-	-	-	3
M60 7.62 MG	-	-	-	-	-	2	-	2	6
M249 5.56mm MG	-	-	-	-	-	-	2	6	18
M16A1 5.56mm auto rfl	2	7	2	2	25	5	7	26	105
M3A1 11.43mm mchn pistol	1	-	-	-	-	-	-	-	1

TANK COMPANY OF TANK BATTALION.* The tank company of a tank battalion in a mechanized (armored) division may fight in battalion first or second echelon, be in its reserve or be attached to a mechanized battalion.

OFFENSE. The width of a company offensive frontage is 1.5 km; that of a platoon is 500-600 meters. The company is assigned an immediate and a follow on mission (objective) to a depth of up to 3 and 5 kilometers respectively. T company combat formation is structured, as a rule, in one echelon (in an extended line of platoons). A tank company may be reinforced with a mechanized platoon, a Stinger air defense missile crew, combat engineer and other subunits, and be supported by a 155 mm self-propelled howitzer battery.

DEFENSE. The company's defensive area is up to 1.5 km across the front and in depth. In it are prepared platoon strong points up to 700 meters across the front and 500 meters in depth. Main and reserve positions at 150-200 meter intervals are created for tanks, as well as covered shelters near them for the men. The company combat formation is usually in two echelons. Local protection is dispatched 500 meters from the forward edge.

A company tactical group may be created in combat based on a tank company, consisting of the tank company, a mechanized platoon, an engineer squad and an air defense missile crew, which may be supported by a 155 mm self-propelled howitzer battery and other subunits.

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*A tank battalion of a mechanized (armored) division consists of five companies (a total of 523 men): 1 headquarters company and 4 tank companies. It includes 58 M1 Abrams tanks; 6 M3 armored reconnaissance vehicles; 11 M113A1 APCs; 6 self-propelled 106.7 mm mortars; approximately 90 trucks; more than 170 radio stations and other weapons.

INFANTRY COMPANY OF INFANTRY BATTALION.* An infantry company of an infantry battalion in a light infantry division may fight in battalion first or second echelon (used, as a rule, on secondary axes or on heavily intersected terrain); it may be in its reserve, or it may coordinate with tank and mechanized subunits.

OFFENSE. The company attack frontage is up to 1.5 km wide; that of a platoon is up to 400 meters. An immediate and follow on mission (objective) is assigned to the company, to a depth of 1.5-2 and 3-4 km respectively. As a rule the company combat formation is structured in one echelon with a reserve. An infantry company may be reinforced with a combat engineer squad, a Stinger air defense missile crew and other subunits, and be supported by a 105 mm towed howitzer battery and a section of Tow self-propelled ATGMs. Motorcycles may be attached for special missions (reconnaissance, raids, etc.).

DEFENSE. The defensive zone is up to 1.5 km in width and up to 800 meters in depth. Platoon strong points are prepared, 300-400 meters in width and up to 200 meters in depth. The company combat formation is usually structured in two echelons. Attached artillery and antitank weapons are deployed in the area in order to reinforce the antitank defense, provide fire support for the first echelon and support a company and battalion counterattack. Local protection is dispatched 500 meters from the forward edge.

For the period of a battle two firing groups of four men each (commander, machinegunner, RPG grenadier and one or two riflemen) are created in an infantry squad.

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*There are 4 companies (a total of 561 men) in an infantry battalion of a light infantry division: 1 headquarters company and 3 infantry companies. The battalion has 4-106.7 mm mortars on an M966 truck; 4 Tow ATGM launchers on an M966; 18 Dragon ATGM launchers; 58 M203 RPGs; 9-60 mm mortars; 34 1-1/4 ton M966 trucks; 15 motorcycles and other weapons.

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TRAINING OF RESERVISTS FOR FRG AIR FORCE

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 41-44

[Article by Lt Col S. Vasilyev: "Training of Reservists for FRG Air Force"]

[Text] Military and political leaders in the FRG, continuing to follow the policy of preparing for an aggressive war against the Soviet Union and the other countries of the socialist community, which was developed by U. S. and NATO militaristic circles, are stepping up measures to strengthen their armed forces, raise their combat readiness and combat effectiveness and create favorable conditions for them to accomplish their combat missions. Under the influence of the American strategy of "direct confrontation," the FRG leadership (like the NATO bloc leadership as a whole) acknowledges the possibility that, along with a general nuclear war, a limited war with the use of both weapons of mass destruction and solely conventional weapons may be waged in Europe.

According to foreign press reports, the likelihood that a war may be waged by solely conventional weapons requires the Bundeswehr command to re-examine its views on some of its aspects, in particular on the duration of combat operations, and in connection with this the role, importance and influence of previously trained reserves on the course and outcome of the war. An indication of this is found in the more frequent recent statements on this question by representatives of the Bundeswehr command of various ranks. Thus, Lt Gen Zommerhof, Air Force chief of administration, in an interview in the West German journal LUFTWAFFE, stated: "If it is considered correct that we will have to wage combat operations with the use of conventional weapons as long as possible, our existing reserves will be inadequate. Therefore, along with the military callup organs, we must take steps to change the existing situation... and introduce a reservist training system that would support the creation of a numerically sufficient contingent of trained reservists, prepared at any time to accomplish their duties as members of the air force.

As has repeatedly been stated in the foreign press, until recently the FRG military leadership, as well as the air force command, paid inadequate attention to reservist training. All such questions were given completely over to the district callup points, which from time to time, based on their specific capabilities and conditions, called up a few reservists to take part

in exercises or attend short assemblies. At the present time, in the opinion of foreign military specialists, in connection with the change in the views of the role of a trained reserve in future war, the search for ways to most effectively use the hundreds of thousands of specialists who have been trained in the Bundeswehr during mobilization deployment of the armed forces and during the course of a war is a most important problem.

According to information in the FRG military press, approximately 200,000 personnel are released from the Bundeswehr annually, the majority of whom are placed in first line reserves, or the so-called constant readiness reserve for a period of 12 months. Reserves in this category are intended mainly to fill up cadre large units and units, which much ensure that they are brought to a high level of combat readiness in a short period of time. After a year in the constant readiness reserve the personnel are automatically transferred to second line reserves. Reserves of this category are intended, as a rule, to man cadre units and subunits as well to replace losses during combat operations.

The air force command also pays much attention to questions of creating a highly organized and trained reserve. According to foreign press reports, in peacetime there are 104,000 personnel in the FRG Air Force, and upon mobilization deployment it is planned to bring this number to 197,000. Out of the overall number of reservists called up, 53,000 are intended mainly to bring regular large units and units to their wartime strengths and 40,000 are to man cadre units and subunits which in peacetime are manned at low levels, as well as to replace air force personnel losses which occur during the war. In addition, it is noted that in accordance with an agreement concluded between the U. S. and the FRG, during a threatening period or in case of a war which begins suddenly it is planned that 8,500 Air Force reservists will be assigned to American armed forces located in West Germany. They are to organize a number of engineer, construction, medical and other auxiliary subunits, intended to support the combat operations of American troops.

According to foreign press information there are at present almost 400,000 reservists on the roles of the FRG Air Force. Bundeswehr mobilization plans provide for deploying 495 auxiliary subunits (squadrons, companies, batteries, platoons) into the air force in an emergency or at the start of a war. In peacetime only a small portion of them are held in the status of cadre units; the bulk exist only in plans. Among subunits planned for deployment are security companies and separate platoons (217); anti-aircraft artillery batteries (53); anti-aircraft machinegun platoons (60) and runway rapid restoration companies (21).

Since, according to calculations of the Bundeswehr command, upon mobilization deployment of the air force more than 46 percent of air force personnel will be reservists, high combat readiness and combat effectiveness of air force large units and units in case of war can be achieved quickly only if reservists constantly maintain a high level of professional skill and psychological readiness to join immediately the units (subunits) to which they are assigned.

To achieve these objectives a number of steps are being taken in the FRG to improve substantially the reserve training system. In particular, during 1984-1985 a system for augmenting air force large units and units with personnel in the event of mobilization and during combat operations, as well as new statutes on holding mobilization exercises involving substantial contingents of personnel were developed and put into effect. In connection with this, as the Western press emphasizes, a systematic increase has been noted in the levels of reservist participation in drills, tactical exercises and meetings. Thus, while in 1981 approximately 13,000 reservists were called up for these purposes, in 1984 the number exceeded 19,400. In 1981, 43 percent of those called up were involved in meetings for retraining or participation in exercises of air force regular units and subunits. In 1984 only 21 percent of the reservists called up were involved in this form of training; the majority took part in mobilization exercises as members of cadre units.

The West German press reported, for example, that in 1984 and 1985 a number of relatively large mobilization exercises were conducted in the Bundeswehr Air Force, including exercises of the 33d regular and 44th cadre fighter-bomber squadrons; the 2nd and 5th Air Force training regiments; the 6th regiment of the MTO [Materiel Support] command and others. A substantial number of reservists took part. As a rule the exercises lasted two weeks. During the exercises the following main tasks (most common for the majority of exercises) were worked out: notification and assembly of reservists; checking plans for transition of large units and units from a peacetime to a wartime footing; equipping subunits with personnel, weapons and military equipment to wartime tables; receiving from depots and taking out of reserve storage weapons and military equipment; organizing security and air defense of basing airfields and other air force facilities; imbuing reservists with skills in the use and maintenance of organic weapons and equipment.

This form of training reservists pursues the objective of most fully familiarizing them with the duties which they are intended to fulfill and with their weapons systems, equipment, apparatuses, etc., and inculcating in them sufficiently firm skills in one or another specialty so that lengthy training will not be required (in the case of an urgent callup).

To maintain the reservists at a high level of training the intervals between exercises in which they participate have been reduced. Thus, at present cadre anti-aircraft artillery batteries and security subunits carry out exercises once every two years, and other subunits once every three years.

As the foreign press has noted, introduction of the reserve officer category in the Bundeswehr substantially increased the ability to man air force large units and units with command cadres. However, augmenting them with reserve officers in flying, as well as engineering and technical specialties is difficult, in view of the constantly increasing complexity and improvement in weapons systems and military equipment. As a result of this, many reservists are not prepared to fulfill their duties at a high level of quality. In particular, according to statements by some FRG Air Force military experts, a combat aircraft pilot after three years in the reserves requires thorough

retraining in the event of his callup before he will be able to fly a fighter with sufficient confidence.

At present the air force command is examining a number of proposals for organizing the training of a reserve of combat aircraft pilots. In particular, the possibility is being studied of creating a reserve of the same type as the U. S. Air National Guard, using F-104 fighter-bombers which have been withdrawn from the Bundeswehr inventory. A serious obstacle to implementing this proposal, as is indicated in the FRG press, are the additional expenses which will be required to keep maintenance personnel and aviation equipment. Nevertheless, in 1985 the "Commando" Separate Air Squadron [eskadra] , equipped with F-104 aircraft withdrawn from the inventory of other units, was constituted in the FRG Air Force at Erding Air Base. It includes two squadrons [eskadrilya] (18 aircraft each) and is intended for deployment upon mobilization. Training of reserve pilots is to be organized based on this squadron. Such forms of training air force reservists as short assemblies conducted at the end of each work week have also figured in their calculations.

The West German Air Force command is also examining a number of other measures with the objective of raising quality of training of reserve military personnel and increasing the numbers of those trained. Lt Gen Zommerhof, in the above mentioned interview, states, for example: "During our study of the problem it is becoming obvious that in the next few years it will be necessary to make maximum efforts to improve the quality of training of those called up for military service, in the interests of creating a highly trained air force reserve." To achieve these goals it is recognized as necessary, in particular, to increase the number and capacities of air force ranges and training centers used to train reservists. At present the air force has 600 ranges, training fields and centers where training (retraining) of reservists is carried out. Their overall capacity is 12,000-13,000 men per year. By the end of the 1980s it is planned to increase this number to 60,000.

In addition, the FRG Air Force command has recognized the advisability of involving reservists not only in unit training but also in command post exercises (KShU) [CPX] and drills. It has been reported that in 1985 more than 100 reserve officers were called up into the Bundeswehr Air Force 4th Air Division to take part in the NATO Combined Armed Forces CPX Wintex-85.

In order to heighten the interest of reservists in taking part in exercises and meetings, recently the practice has begun of awarding them their next military rank upon completion of exercises. Air force large unit and unit commanders have been directed to strengthen their contacts with reservists in every possible way, placing this work on a permanent footing. For these purposes an officer has been assigned in each large unit who is responsible for maintaining contacts with them. He has been assigned to inform officers, noncommissioned officers and enlisted personnel attached to the large unit (unit) about the life and activity of the air force, and to invite them to various types of measures being carried out in the unit (anniversaries, celebrations in honor of veterans, meetings with community representatives, sports competitions, etc.).

Recently the Bundeswehr command has been attempting in every way to raise in the eyes of the FRG public the importance of reservists in ensuring the security of the country. One of the ways of achieving this objective is considered to be granting reservists the opportunity to wear the military uniform not only while they are attending meetings or exercises, but also at any other time.

As the foreign press notes, the Bundeswehr command as a whole, and the Air Force command in particular has been increasing its activity in recent years, carrying out a complex of measures aimed at improving the system while preparing a trained reserve. Their most important objective is to reduce the amount of time required to bring large units and units to a high degree of combat effectiveness and combat readiness, and in the final analysis raise their military capabilities. Thus, the Western press emphasizes that in 1985 the FRG Air Force Chief of the general matters administration was named responsible for the training and manning of the reserves. The first department of the headquarters of this administration is the training organ and is responsible for mobilizing reserves during air force military training in peacetime, in a threatening period and during war.

Direct training and retraining of air force reservists is assigned to the training and transport aviation commands, the cadres (reserve) administration and the medical service. In the opinion of the Bundeswehr command, already in 1985, after the adoption of the "special instructions on attracting women into the Air Force reserve," the prerequisites were created for completely supporting air combat operations with personnel reserves. At present proposals on the FRG Air Force reserves and structure in the 1990's are being developed.

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FORCES AND RESOURCES FOR GROUND DEFENSE OF U. K. AIR FORCE AIRFIELDS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 44-47

[Article by Col V. Artemyev and Col L. Konstantinov: "Forces and Resources for Ground Defense of U.K. Air Force Airfields"]

[Text] Simultaneously with building up the military might of their air force, U. K. military leaders are paying much attention to the defense of air bases, airfields and runways against enemy air strikes mainly from low and extremely low altitudes, as well as from attacks by ground, air assault and other forces which have infiltrated or been moved by air.

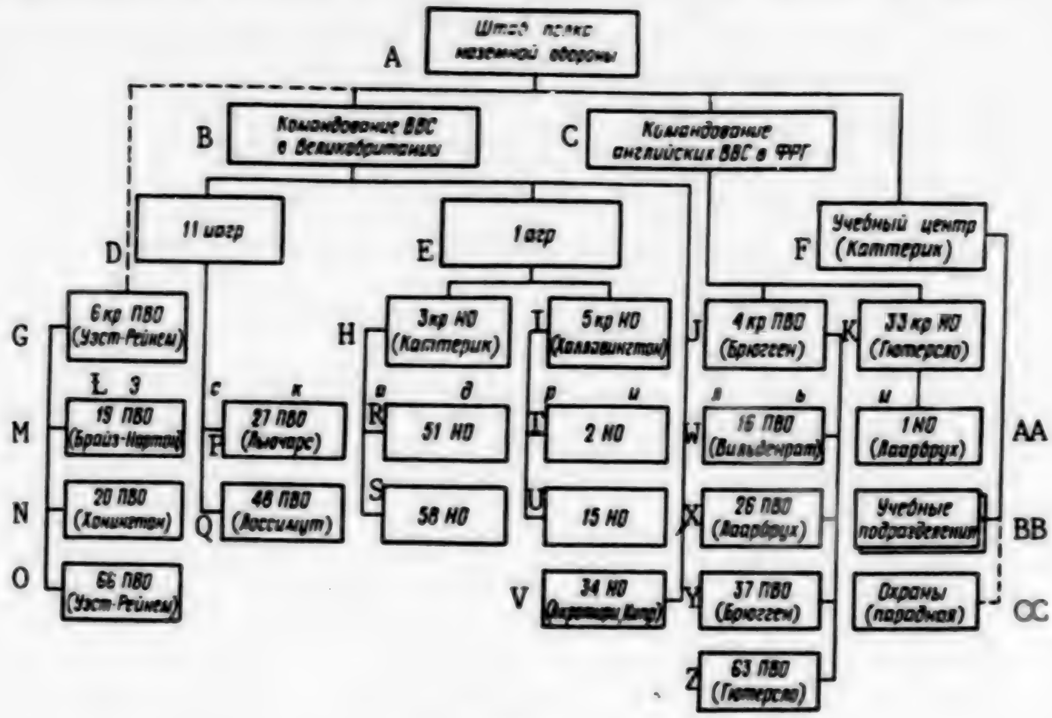
According to foreign press reports these missions have been assigned to special forces tied into the so-called airfield "ground defense regiment" of the U. K. Air Force. Organizationally, it includes five wings (4th and 5th air defense wings and 3rd, 5th and 33d ground defense wings), which in turn consist of corresponding squadrons. The latter, in the views of British specialists, are considered the basic tactical subunits, which are capable of accomplishing their assigned missions both independently and in coordination with other units and subunits. The regiment has squadrons of two types, air defense squadrons and light armored squadrons. In addition, it includes airfield security subunits, some of which are also named squadrons. The organization of the regiment is shown in more detail in Figure 1.

The air defense squadrons have Rapir short range air defense missile systems (towed variant) and are to defend airbases, forward airfields and landing strips against enemy air strikes. The regiment has nine such squadrons, four of which are deployed at airbases of the British Air Forces in the FRG: the 16th at Wildenrat Air Base; 26th at Laarbrucht; 37th at Bruggen (4th Wing Headquarters is located there) and the 63d at Guterslo. Two squadrons (27th and 48th) are on the territory of Great Britain (Luchars and Lossimuth air bases) as part of the 11th Fighter Air Group and three (19th, 20th and 66th, at Brize-Norton, Honington and West Rienem air bases respectively) are in the 6th Ground Defense Wing (West Rienem), which is intended to provide cover for U. S. Air Force bases in the British Isles.

An air defense squadron includes a headquarters, two operating wings (of four Rapir systems) and an equipment and weapons maintenance and repair wing.

Figure 1.

Organization of British Air Force Airfield Ground Defense Regiment



LEGEND

A -- ground defense regiment headquarters
B -- Air Force command in Great Britain
C -- Command of British Air Force in the FRG
D -- 11th Fighter Air Group
E -- 1st Air Group
F -- Training center (Katterik)
G -- 6th AD Wing (West Reinem)
H -- 3d Ground Defense Wing (Katterik)
I -- 5th Ground Defense Wing (Hallavington)
J -- 4th AD Wing (Bruggen)
K -- 33d Ground Defense Wing (Guterslo)
L -- Squadrons
M -- 19th AD (Brize Norton)
N -- 20th AD (Honington)
O -- 66th AD (West Reinem)
P -- 27th AD (Luchars)
Q -- 48th AD (Lossimuth)
R -- 51st Ground Defense
S -- 58th Ground Defense
T -- 2d Ground Defense
U -- 15th Ground Defense
V -- 34th Ground Defense (Akrotiri, Cyprus)
W -- 16th AD (Wildenrat)
X -- 26th AD (Laarbrucht)
Y -- 37th AD (Bruggen)
Z -- 63d AD (Guterslo)
AA -- 1st Ground Defense (Laarbrucht)
BB -- training subunits
CC -- security (parade)

As a rule a squadron is responsible for the defense of one airfield. Its subunits are moved several kilometers beyond the boundaries of this airfield in order to combat enemy aircraft before they arrive at the target. For this purpose all of its wings have appropriate ground transportation. According to foreign press reports, in order to make it possible to conduct combat operations at night and under poor meteorological conditions, the operational Rapir air defense missile squadrons have been equipped with the DN-181 Blind Fire radar stations. Previously they were supplied only with optical fire control systems.

According to exercise experience, some of the forces and resources of the squadron may be used for air defense of the forward basing position or landing strip located in the immediate proximity of the front line. In particular, during NATO aviation exercises held on FRG territory, Rapir missiles were transferred to provide air defense of landing strips for Harrier vertical and short takeoff and landing aircraft of the British Air Force command in the FRG. It is regularly practiced. Rather often this is done using Chinook-C.1 transport helicopters.

Training personnel for the air defense squadrons takes place at a special training center in Katterik, Great Britain. There Rapir air defense crews from line subunits regularly carry out practical missile launches against aerial targets.

According to the views of the British Air Force command the light armored ground defense squadrons must defend airfields and landing strips against air assault attacks and attacks by other enemy ground forces. A regiment has six such squadrons (1st, 2d, 15th, 34th, 51st and 58th). One of them (1st) is deployed in West Germany at Laarbrucht Air Base. The headquarters of the above mentioned 33d Ground Defense Wing is also located in the FRG (Guterslo). Four squadrons, which belong to the 3d and 5th ground defense wings, have been placed under the operational subordination of the 1st Air Group and are located in Great Britain. The Western military press reports that they are in a state of constant readiness for transfer to the FRG. One squadron (34th) is deployed at Akrotiri Air Base on Cyprus.

The squadrons each have four operating wings, in which one is a tank wing which has six Scorpion-like tanks (armed with a 76 mm gun and a 7.62 mm machinegun; crew of 3) and 3 are mechanized infantry, each with 5 Spartan armored personnel carriers (7.62 mm machinegun; crew of 2 or 3; can carry 4 or 5 armed soldiers). Moreover, a squadron has a Samson armored repair and evacuation vehicle (7.62 mm machinegun, crew of 3 or 4), and a Saltan command-staff vehicle (7.62 mm machinegun, 5 or 6 personnel) equipped with appropriate radio communication apparatuses. It is noted in the foreign press that the Spartan, Samson and Saltan were manufactured based on the Scorpion tank. There are a total of 160 personnel in the squadron.

According to Western press reports, the ground defense squadron subunits are positioned as a rule, outside of the object being protected and the zone of their responsibility ranges out to 10 km. Thus, the Rapir air defense missile system positions are also under their protection. During military training the subunits regularly look at questions of defending forward airfields and

landing strips located a substantial distance from their permanent places of deployment. They move to the given areas, usually on their own means of transport, but they may also be transferred by air (all other vehicles in their inventory are adapted for such movements).

The training of the personnel for the ground defense squadrons is also carried out in a training center in Katterik. It is noted that in case of need one more such subunit can be activated from permanent personnel at the center and military equipment there. In addition, in this center is a royal parade security squadron which is to be transferred to the FRG in wartime.

The U. K. Air Force command, using as a cover the notorious slogan about the "Soviet military threat," and developing plans for future war, has stated repeatedly that the existing forces and resources of the airfield defense regiment are inadequate to accomplish the missions assigned to it. Under the pretext that if the squadrons are transferred to the FRG important air force facilities in Great Britain will supposedly remain without reliable protection, six auxiliary cadre squadrons were activated: 2503d (Skampton Air Base); 2620th (Marem); 2622d (Lossimuth); 2623d (Honnington); 2624th (Brize-Norton) and 2625th (Sant-Mogan), which are also subordinated to the ground defense regiment.

Each of the squadrons includes 11 cadre service personnel and 134 reservists According to the table of organization there are to be 8 officers, 14 non-commissioned officers and 123 enlisted personnel. As a rule, the reservists are called up from the locale where their subunit is located, based on the belief that this will be an incentive for voluntary service ("home protection"). For studies and military training the reservists are called up to the subunits once per month for two days (Saturday and Sunday) and once per year for two weeks. The squadrons have small arms (rifles, carbines, machineguns and grenade launchers), and 51 mm Merzer mortars, and they have a sufficient amount of motor transport (mainly Landrover type light trucks).

The foreign press has noted that to reinforce the air defense subunits of the airfield defense regiment, in April 1985 a decision was made to form an auxiliary air defense squadron, equipped with two-tube 35 mm Erlikon air defense guns, which were taken along during the Anglo-Argentine conflict in the Falklands (Malvinas). The squadron has 12 such guns and 4 fire control radars. According to the latest Western press reports the U. K. Air Force command plans to form one more such squadron.

Thus, the fighting strength of the U. K. Air Foce Airfield Defense Regiment alone numbers 15 squadrons, armed with more than 70 Rapir air defense missile systems; 36 Scorpion tanks; approximately 90 armored personnel carriers and other military equipment. They have more than 2,000 men. According to calculations of foreign specialists, when the personnel of the training centers and reserve components are included the amount of military equipment will substantially increase and the number of personnel will exceed 3,500.

The combat readiness of U. K. Air Force Airfield Defense Regiment units and subunits is tested during various exercises. Conclusions are drawn from the results on additional measures to enhance their military capabilities.

In particular, a special exercise of U. K. Air Force ground defense forces was held at the Zoltanau Range (FRG), code named Gazelle Arabian, at which tasks of ensuring the protection and defense of forward airfields (landing strips) of Harrier tactical vertical or short takeoff and landing fighters were practiced.

The headquarters of the 5th (Hallavington, Great Britain) and 33d (Guterslo, FRG) wings; two ground defense squadrons and Harrier aircraft from the British Air Force command in the FRG were involved in the exercise. Subunits of the 4th Armored Division, British Army on the Rhine, and two squadrons of the 33d Wing (1st and 2d) acted as "enemies." A total of more than 400 personnel and up to 100 combat vehicles of various types took part in the exercises.

In the first stage tasks of deploying forward airfields and organizing their defense were solved. Personnel of two ground defense squadrons, one motor transport squadron and the 10th Engineer Company were involved in preparing the forward airfields.

In the second stage operations of defending the protected objective against the air enemy and repulsing an air assault were practiced. The air assault force was dropped from an altitude of 240 meters out of Chinook-C.1 helicopters (7 men each). Personnel of the second squadron, 33d Ground Defense Wing -- the only U. K. Air Force squadron trained as a parachute assault subunit -- took part in the assault.

As the foreign press notes, in the last six years this was the first time such an exercise was conducted. Future plans are to conduct similar measures regularly (the next was intended for 1986).

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U. S. RESEARCH ON AERODYNAMIC CONFIGURATIONS FOR A 'SLANTED' WING AIRCRAFT

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 47-49

[Article by Col N. Ivanov: "U.S. Research on Aerodynamic Configurations for a 'Slanted' Wing Aircraft"]

[Text] As they attempt to improve the flight characteristics of aircraft, especially their range or payload, American aviation designers are examining various new aerodynamic configurations of airfoils. One of these configurations is an aircraft with a "slanted" variable sweep wing; i.e., a wing the sweep of which changes as the wing turns as a unified hole relative to the normal axis of the aircraft. In the opinion of American specialists this provides the same advantages as does a wing with a direct variable sweep and, moreover, makes it possible to reduce the frontal drag and weight of the aircraft design. This is achieved as a result of the following factors:

1. When the sweep angle of a "slanted" wing is increased the point of lift does not move back relative to the aircraft center of gravity as it does for a straight sweep wing. In connection with this, to balance the aircraft it is not necessary to increase the aerodynamic load on the stabilizer and correspondingly increase the drag or take any special measures to move back the aircraft center of gravity while changing the sweep of the wing.

2. In an aircraft with a "slanted" wing it is easier to distribute weights along the length of the airfoil and to accomplish the "area rule" which also substantially reduces its frontal drag.

3. The "slanted" wing has only one hinge, not two like a straight variable sweep wing. Moreover, cantilever bending moments are locked into the design of the wing itself and in symmetrical sustained flight are not transferred to the hinge, on which only lift, drag and torque impact. (Figure 1) Therefore, the wing can be constructed as a single entity without any connections, which makes it possible to reduce substantially the weight of the design of the wing, hinges and fuselage compartment where it is affixed.

4. The lower aerodynamic load on the stabilizer in flight at high sweep angles and when maneuvering, compared with an ordinary straight-sweep wing,

provides fewer bending moments in the tail section of the fuselage, which makes it possible to lengthen its design.

Figure 1. Forces and moments acting on a "slanted" wing (left) and a swept back wing: 1 -- lift; 2 -- torque; 3 -- bending moment.

5. Finally, a less powerful gear is required to change the sweep angle of a "slanted" wing, since it is not necessary to overcome frontal drag forces. This makes it possible to reduce the weight of both the gear itself and of the design elements which interact with it.

American experts consider the aerodynamic link between pitch, bank and yaw when the aircraft attack angle is increased at high wing sweep angles to be the most obvious shortcoming of the "slanted" wing. The cantilever of a swept back wing operates with higher effective attack angles than does the cantilever of a wing with forward sweep. As a result, an asymmetry in the lift of the cantilever arises, as a result of which there is a change in bank and pitch. Moreover, the asymmetric lift of the cantilever creates an asymmetric drag which dictates the moment of yaw. These moments cause perturbations in pitch, bank and yaw. It is believed that this shortcoming can be eliminated by employing a digital control system which compensates for the aerodynamic interrelationship of the moments. Moreover, the use of composite materials with anisotropic characteristics in wing construction makes it possible to eliminate partially the aerodynamic asymmetry through wing deformation under load.

Another shortcoming of the "slanted" wing is considered to be the increase in the thickness of the boundary layer along its span, which is twice as great as for an ordinary swept wing, as a result of which the problem of controlling this layer is substantially complicated. Any reduction in lift as a result of a break in the flow caused by the increased thickness of the boundary layer causes asymmetrical movement. The same methods can be employed to control the break in the boundary layer on a "slanted" wing as are used for a straight wing or swept back or swept forward wing; for example, installing vortex flow or wing profile generators which specially maintain favorable pressure gradients in the boundary layer.

According to foreign press reports, in the early 1970s the Boeing firm conducted comparative research on supersonic transport aircraft with a fixed swept wing; a variable swept back wing and a variable swept "slanted" wing.

As a result of the research it was concluded that the lightest weight and quietest aircraft in accomplishing transport missions would be an aircraft with a "slanted" wing of variable sweep and that it would be advisable to study such an aerodynamic configuration in detail. However, in connection with the cessation of efforts to build a supersonic transport aircraft, caused by the cost of fuel required for supersonic flight, research into a "slanted" wing was temporarily halted.

Subsequently, theoretical and experimental (wind tunnel) research was conducted on the use of a "slanted" wing on aircraft of another type. However, no detailed assessment of the design of such aircraft was published during these experiments. Testing in wind tunnels confirmed the theoretical forecasts relative to the aerodynamic characteristics of the "slanted" wing and, at the same time, established the limits of the theory.

In 1976 a program of research into the flight dynamics of a "slanted" wing aircraft was carried out on a radio-controlled pilotless airfoil. Experiments in a wind tunnel, by a simulator and in flight were conducted in accordance with this, and the reactions of the operator controlling the apparatus were also studied. The results of three flights at wing sweep angles up to 45 degrees confirmed theoretical conclusions, the foreign press notes.

In 1979-1981 the National Aeronautics and Space Research Administration (NASA) carried out a program of tests of the "slanted" wing on the AD-1 manned experimental aircraft, built at its order. (Figure 2) The aircraft had a trapezoidal wing hinged on the upper part of the fuselage in such a way that its sweep angle could be changed from 0 to 60 degrees in flight. Its power plant consisted of two turbojet engines with 100 kg (force) thrust each; it had a take-off weight of 800 kilograms. The wing span was 9.75 meters and wing area was 8.6 square meters. It had a crew of one. The flight control system was an ordinary mechanical system, without interaction among control organs and without electronic stability enhancement devices.

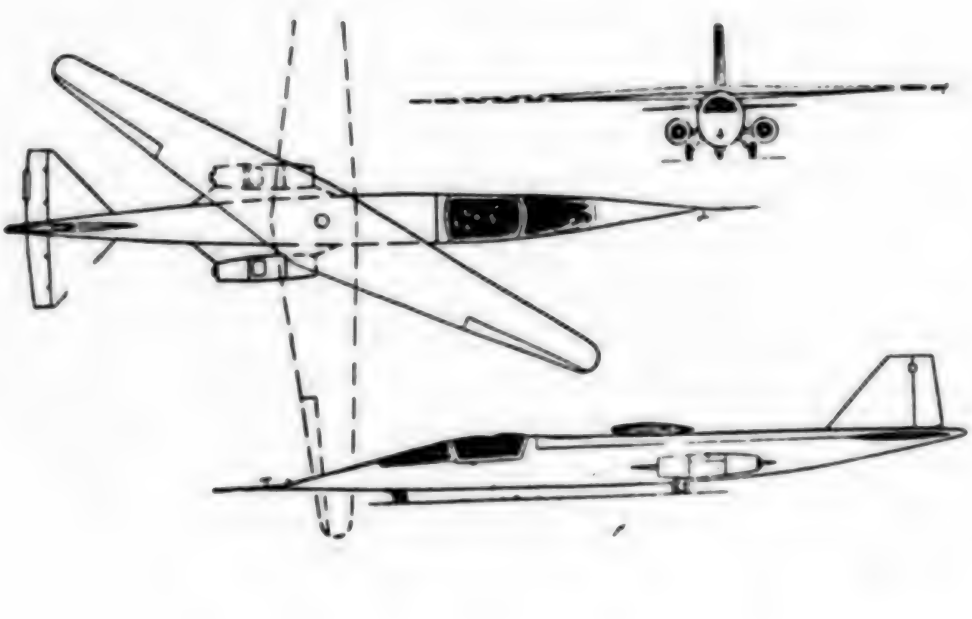

Figure 2. Drawings of general views of the AD-1 experimental aircraft with "slanted" wing.

Flight testing the AD-1 took place at flight speeds of up to 400 km per hour and at sweep angles of 0-60 degrees. Seventeen pilots took part. Their mission included assimilating the flying technique and researching the unique features of an aircraft with "slanted" wings. It was reported that the design and flight testing process of the AD-1 aircraft substantially expanded the scientific and technological base for the creation of aircraft with "slanted" wings and, at the same time, showed that it was necessary to conduct flight testing at a broader range of flight speeds, including supersonic.

Somewhat later the American firm, Rockwell International, began to undertake comparative design research in the interest of the U. S. Navy of carrier-borne fighters with variable sweep "slanted" wings and variable swept back wings (Figure 3). It was considered that in carrying out combat missions such an aircraft must carry ten AIM-120 air-to-air guided missiles; take off from an aircraft carrier; fly under cruising flight conditions at a radius of 550 km from the aircraft carrier; patrol within this radius; accelerate to supersonic speed; fly at this speed a distance of 185 km; launch guided missiles against air targets and return to the aircraft carrier at cruising speed.

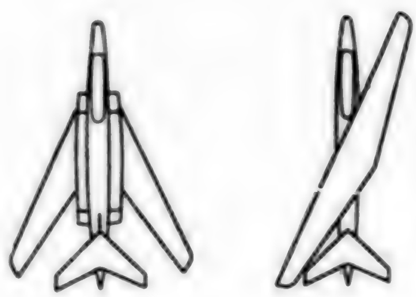

Figure 3. Fighter diagrams according to Rockwell International design studies: left -- with variable swept back wing; right -- with slanted variable sweep wing.

The aircraft of both configurations had identical fuselages. The length of both the "slanted" wing and the swept back wing at zero angle of sweep was 10.2, and the maximum angle of sweep was 65 degrees. Research results showed that the aircraft with a "slanted" wing, depending on flight conditions, had frontal drag 11-21 percent lower than the aircraft with the swept back wing, and in configuration for supersonic flight the aircraft with the "slanted" wings had 26 percent less wave drag. When all the aerodynamic and design factors were calculated the aircraft with the "slanted" wing could have 17 percent less takeoff weight or given identical takeoff weights would have a 29 percent greater operating radius than the aircraft with variable swept back wings.

To implement the "slanted" variable sweep wing it was necessary to conduct flight tests of an aircraft so configured at supersonic speeds. Therefore, the U. S. Navy and NASA developed a joint program which provided for four stages of flight testing of a "slanted" wing on an experimental F-8 aircraft (carrier-borne Crusader Fighter with "slanted" wings), capable of flying at supersonic speeds (Figure 4).

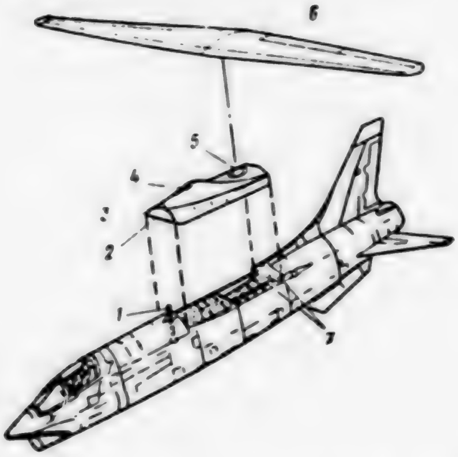

Figure 4. Modified components and assemblies of the F-8 experimental aircraft: 1 -- gear for changing established wing attack angle; 2 -- attachment mount for the gear for changing established wing attack angle; 3 -- wing supporting structure; 4 -- cowling; 5 -- hinged wing attachment mount; 6 -- "slanted" wing; 7 -- rear attachment mounts of wing support structure.

In the first stage, which was completed in 1983, the capability for creating a supersonic experimental aircraft was studied. In the second stage (lasting 12 months) it was planned to develop an aircraft design and flight control laws, taking into account characteristics, including cruise flying at high subsonic speeds; flying with extended acceleration to Mach 1.6 and maneuvering at a maximum possible altitude and a speed of Mach 1.4. Work in the second stage is being accomplished by Rockwell International, with which NASA concluded a $400,000 contract in November 1985. In the third stage it is intended that a "slanted" wing will be manufactured; the S-8 aircraft system will be modified; a wing will be installed on it and ground testing will take place. The fourth stage (planned to begin in the first quarter 1989) provides for flight testing, during which 40 flights are to be conducted.

9069
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NEW AMERICAN GUIDED MISSILE

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 50-51

[Article by Col V. Kirsanov: "New American Guided Missile"]

[Text] The buildup of the military capabilities of American strategic aviation -- one of the components of strategic offensive forces -- which is being implemented by the Pentagon within the framework of a multi-year comprehensive program, is being carried out, judging by Western press reports, both by modernizing the aircraft fleet, and through all-round improvements in the means of destruction, most of all of air-to-ground missiles. Although, since the mid-1970s the dominant role in this field has belonged to air based cruise missiles, nevertheless, the U. S. Air Force command has not left unattended the AGM-69A SRAM (short range attack missiles) which are in inventory.

The Boeing firm began to develop this guided missile back in the mid 1960s. By 1969 a launch of its first experimental model was conducted, and during 1972-1975 1,500 SRAM missiles were manufactured and delivered to strategic aviation units. Equipped with an approximately 200 kiloton nuclear warhead, the guided missile has a maximum range of 220 km. The missile service life initially was five years and was determined mainly by the ability of the solid fuel missile engine (RDTT) to maintain the required reliability and ensure the specified tactical flight characteristics. Although constant observation conducted by specialists of the current state of the engines made it possible to extend their service life first to 7 1/2 and then to 10 years, back in 1976 the U. S. Air Force decided to replace the existing RDTT and submitted an order to the Thiokol firm to develop a new missile engine. Tests were completed in 1981 and by the end of 1984 all SRAM guided missiles were equipped with new, more reliable engines. American experts believe this will make it possible to retain the missiles in the strategic bomber inventory at least until the end of this decade.

It has been noted in the foreign press that, despite the appearance of the AGM-86B air based cruise missiles in strategic aviation units in fall 1982, the U. S. Air Force not only did not plan to remove SRAM guided missiles from inventory in the 1990s, but to the contrary, studied the possibility of developing a new, more effective strike missile of the same type. These

plans, according to AIR FORCE MAGAZINE, were actively supported by the Pentagon, which in October 1983 approved the Air Force plan, which provided for the development of a supersonic air-to-ground guided missile to replace the SRAM. As JANE'S DEFENSE WEEKLY reported in this regard, the SRAM, which have been in inventory since 1972; i.e., more than 14 years, were developed using technologies of the 1960s. As a result they are both old and obsolete, which makes it senseless to resume either their series production, or their modernization, since in the latter case it would be necessary to remake completely virtually every one.

Having received Department of Defense approval, in early 1984 the U. S. Air Force proposed to eight leading American aerospace firms that they research the possibility of developing a new strike missile, called the AASM (advanced air-to-surface missile), which was to meet the following main requirements.

1. The guided missile engine should be a solid fuel missile or a liquid jet engine, although the possible use of a highly effective turbojet was not excluded. Not limiting the developers in choice of engine type, U. S. Air Force leaders insisted, nevertheless, that the new missile have supersonic flight speed and range no less than that of the existing SRAM.

2. Flight guidance must use a relatively simple inertial system, which reliably guides the guided missile to target and makes it possible to avoid using a correcting subsystem, such as the TERCOM that is installed on cruise missiles. The latter is not only distinguished by design complexity and requires highly skilled maintenance, but also requires the creation of special organs for the preparation of flight targets, which is considered absolutely unacceptable for the new generation guided missile. At the same time, U. S. Air Force specialists continue to study the advisability of equipping the missile with an autonomous self-guidance system.

3. The detectability of the guided missile by enemy air defense weapons, which is determined most of all by the size of the effective cross-section area, must be at least no greater than that of the SRAM. Air Force experts link the possibility of reducing this parameter to the wide use of composite materials in the missile design and to using computer assistance to optimize its aerodynamic configuration.

4. Equipping the missiles with nuclear warheads is among the most important Air Force requirements. The Air Force resolutely rejects any proposals which provide for the possibility of equipping it with a conventional warhead. In the opinion of American military specialists, the development of a so-called "common" missile, suitable for a nuclear or conventional warhead, would undoubtedly necessitate compromise design decisions which could have a negative effect most of all on the military specifications of the nuclear variant.

The conceptual work, which was done taking into account the above enumerated requirements, lasted approximately 12 months. In early 1985 the U. S. Air Force, having examined the proposals presented by the firms, narrowed its choice to the designs of three companies (Boeing, Martin Marietta and McDonnell Douglas) which it commissioned to continue the development of the

new missile on a competitive bases and allocated the necessary appropriations. According to foreign press reports it was in this stage that the new missile was designated SRAM-2, by which it was emphasized that in the future it was to replace the already old SRAM. It has also been noted that the firms which received contracts to carry out the second stage of development will concentrate their main attention on selecting an engine type and determining the weight and dimension specifications of the missile. The latter was stipulated by a requirement of the U. S. Air Force command, which planned to use the general purpose rotary launch platform intended for the B-52, B-1B and in the future also the ATB bombers, developed by the Boeing firm to suspend new guided missiles.

According to a report by INTERNATIONAL DEFENSE REVIEW, the results obtained by the end of 1985 made it possible to modify some of the provisions of the tactical-technical tasks. In particular, a decision was made to halt research in the field of developing a combined ramjet-rocket engine and concentrate efforts on developing only a rocket power plant. This decision was based on results obtained by the Hercules firm which, operating as a subcontractor of MacDonald Douglas, manufactured and demonstrated a stably operating experimental model of a new double-pulse jet engine for the SRAM-2 missile. Moreover, the dimensions of the new guided missile were specified (approximately a third smaller than the existing missile): housing length approximately three meters and diameter 0.37-0.4 meters, which is necessary in order to increase the number of SRAM-2 which can fit in the bomb bays of B-1B aircraft, and thereby significantly increase the ability to suppress enemy air defense missile systems.

By the end of the second stage of research it is planned to narrow the circle of potential suppliers of the new weapon by selecting of the 3 only the 2 most successful designs, and issuing to representatives of their firms contracts for full-scale development lasting up to 18 months. In the concluding stage it is planned that flight tests will be conducted of experimental models of the competitively designed missiles. At the end of 1987, according to the flight test results, it is planned that one firm will be chosen, which will also be authorized to complete the design and organize series production of the new guided missiles. In this regard the bulletin AEROSPACE DAILY wrote that initially it is planned to manufacture a relatively small lot of 100-200 series-produced missiles, and subsequently to increase the rate of their production to the planned level (300-450 per year). Referring to statements by American specialists, the Western press expresses confidence that extensive use of the experience acquired in the process of creating and operating the SRAM guided missile will make it possible to develop the new missile during the time period planned and by early 1989 to be completely ready for series production. The above-mentioned AEROSPACE DAILY bulletin reports that U. S. Air Force plans envision manufacturing an overall total of 1,633 SRAM-2 missiles and, in the first half of 1992, beginning to fit out with them the B-1B bombers assigned for combat patrol.

Emphasizing the merits of the new missile, the journal NATO'S SIXTEEN NATIONS notes that automation of pre-launch operations (entering into the missile computer device current information on the location of the carrier aircraft, target coordinates and navigation and meteorological data) will free the crew

from unnecessary time expenditures and enable it to concentrate on evaluating the situation and selecting tactics in accordance with the specific situation which is taking shape during the nuclear strike. Moreover, the high flight speed of the SRAM-2 (Mach 4.5-5) and great accuracy (CEP less than 60 meters) should enable it to be used to suppress air defense systems and, thereby, make it possible for aircraft carrying cruise missiles and nuclear bombs to penetrate deep into enemy territory.

Stepped up efforts in the program to create the SRAM-2 strike missile indicate that the current U. S. administration, which verbally expresses its readiness to conclude new Soviet-American agreements on reducing strategic offensive weapons, is in fact striving only to build up further the military capabilities of its bomber aviation and give it the ability to make a first "pre-emptive" strike.

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MISSILE WARHEADS FOR DESTROYING AIR TARGETS

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[Article by Col A. Belov, candidate of engineering: "Missile Warheads for Destroying Air Targets"]

[Text] In its constant desire to provide military and military-technical superiority over the Soviet Union, imperialist circles in the U. S. and NATO pay unremitting attention to the development of various types of weapons, carrying out comprehensive research to substantiate efficient characteristics, both of a weapon as a whole and of its individual subsystems.

A functionally important element of any weapon, which ensures that it will achieve the final goal of its use -- the destruction of the target -- is the weaponry section, which includes the warhead and the detonator.

In the opinion of foreign military specialists, the choice of efficient weaponry section parameters, which guarantee high effectiveness, for example of a guided missile (UR), is a multifaceted task that necessitates taking into account the nature of the target being destroyed, the conditions under which the guided missile strikes the target, expected accuracy, mass of the warhead and design of its compartment, as well as modern achievements in the technology of warhead production. It is believed that, if the choice of weaponry section takes place at the stage of integration of the means of destruction, it is necessary to solve the problem of efficient distribution of the functions of destroying the target between the guidance system and the weaponry section. A reduction in the demands upon the guidance system will lead to lower accuracy and may require the use of a more powerful warhead, and sometimes even changes in the nature of the destructive effect.

Foreign experts note two essential features applicable to the task of destroying air targets:

The class of air targets encompasses a very broad listing of objects which differ substantially in their dimensions, survivability and speed and maneuver characteristics. They include, among others, military transport aircraft and helicopters, maneuvering high speed fighters, bombers, small pilotless flying apparatuses, cruise missiles and others.

As a rule, aerial targets in space are in constant movement (hovering helicopters are an exception).

It is believed that these features complicate the task not only of destroying aerial targets, but also of determining an efficient type of means of their destruction, in which small caliber artillery weapons of aviation and air defense systems and air-to-air and ground-to-air class guided missiles have a role.

Methods of Destruction. Two main possible methods of destroying an aerial target are examined: direct hit or close miss (remotely). The former is characteristic of artillery rounds, which are not usually equipped with non-contact explosive systems, since it is believed that this would entail a substantial loss in effectiveness that would not be compensated for by the small supplemental effect achieved in some cases. The high rate of fire of modern automatic weapons ensures a high probability of a direct hit on the target, but at relatively short ranges.

Guided missiles, especially when launched from great distances and against maneuvering targets, have low probabilities of a direct hit. Usually guided missiles fly by the target at a small distance and for them the main method of destruction is remote destruction, in which a warhead explodes at the moment determined by the detonator.

Source of Energy. The energy necessary to destroy the target is contained in the explosive charge and is released when it is detonated, causing a shockwave in the charge, which expands at a speed of 8-9 km per second. Judging by Western press reports, the following tasks are accomplished in the creation of explosives:

The maximum possible release of energy is obtained. This is achieved by the use of energy-intensive explosives of the hexogen and octogen types (their replacement is not anticipated in the near future).

Sensitivity to aerodynamic overheating is reduced. In particular, explosives which have already been created are capable of withstanding temperatures of 200-300 degrees C (by comparison: TNT can withstand 80 degrees C; hexogen -- 140 degrees C and octogen -- from 160 to 170 degrees C). Thermoplastic materials, instead of TNT, are used as the primary binder in these explosives.

Resistance to fire and shelling are increased. It is believed possible to create composite charges which do not detonate in fire or when struck by rounds, bullets or fragments.

High Explosive Effect. Each kilogram of explosive produces approximately 100 liters of gas, which creates a local pressure up to 100 tons per square centimeter. This gas, heated to a temperature of 3,000-500 degrees K, expands rapidly and, compressing the surrounding air, causes a shockwave. The nature of its effect on an aerial target is rather complex; however, it is considered possible to use the following dependency for an approximate definition of

radius D(m) of the high explosive destruction of a target by an explosive charge of mass W(kg):

where co-efficient K   equals 0.3-0.5, depending on the type of target. For small charges this distance is measured not from the center of the target but from the closest point.

Fragmentation Effect. If the explosive charge is contained in a solid (usually metal) casing, the gases obtained as the result of detonation explode the casing. This causes the fragments to scatter at high speeds, depending on the ratio of the weight of the charge to the total weight of the warhead (this ratio is called the co-efficient of warhead charge). After the explosion of the casing the fragments still receive for some time the accelerating effect of the expanding gases -- products of the explosion. Through the fragments the destructive energy spreads to a distance which exceeds the radius of the high explosive effects of the explosive, but only in the direction of flight of the fragments (the field of high explosive destruction is uniform).

The speed of their scattering is an important characteristic of the explosive effect of the fragments. In a simple cylindrical explosive charge all the fragments acquire an approximately equal scatter speed, which can be defined according to the formula:

$$V_0 = K_2 \left(\frac{m}{c} + 0{,}5 \right)^{-\frac{1}{2}},$$

where m is the weight of the warhead casing; c is the weight of the explosive charge; and K   is an experimentally determined constant which depends on the type of explosive and the design of the warhead (usually in the range of 2.5-2.8 km per second).

Without the use of special measures to organize the fragmentation of the casing the fragments differ substantially from one another in weight and dimensions, and the greater share of the energy of the explosion is given out to small fragments which rapidly lose speed in the air and do not have a notable destructive effect due to the small amount of energy delivered to the target. To organize fragmentation various techniques are employed associated with the mechanical processing of the warhead body, the forming of special indentations on the surface of the warhead, the use of manufactured fragments, etc. (Figure 1).

When conical or spherical indentations are used the so-called shaped-charge effect arises, through which a certain number of heavy fragments are obtained, which have scatter speeds up to 4-5 km per second. Warheads of this type are sometimes called multiple shaped-charge warheads, and the fragments formed are called strike nuclei.

A specific variety of fragmentation warhead is the bar warhead with manufactured destruction elements in the form of bars located along its axis

and joined sequentially so that upon scattering they form a uniform zigzag-shaped bar ring.

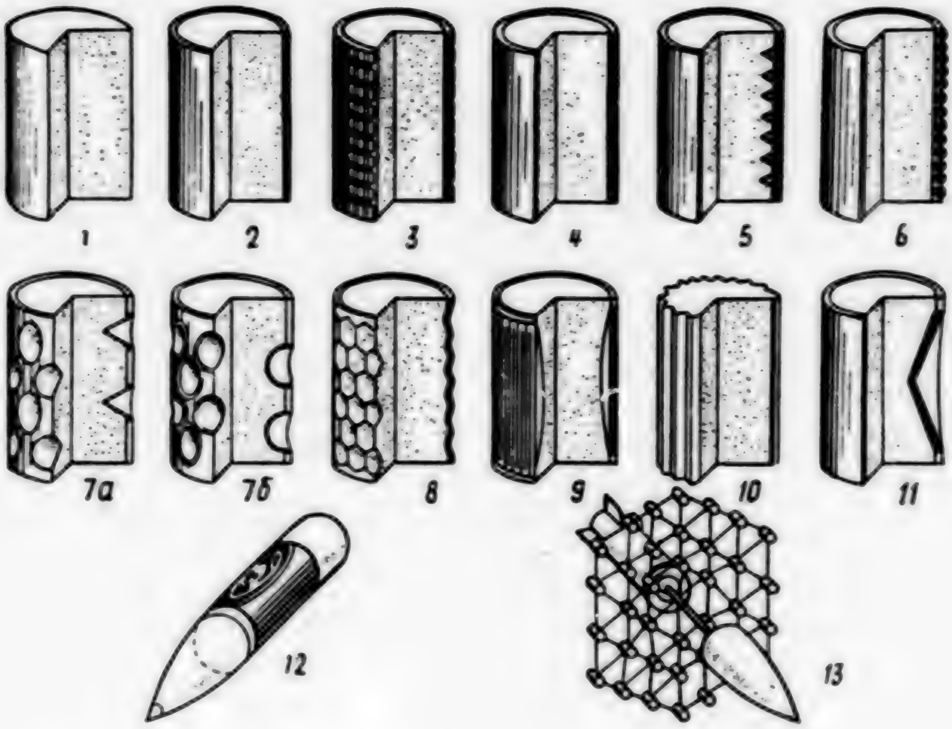

Figure 1. Possible designs of missile warheads for destroying air targets: 1 -- high explosive; 2 -- explosive charge in metal casing; 3 -- external notching of casing; 4 -- internal notching; 5 -- explosive charge with grooves; 6 -- manufactured fragments; 7 -- shaped charge (with conical and spherical indentations); 8 -- multi-chambered charge; 9 -- bar warhead; 10 -- knife-edge warhead; 11 - directional warhead; 12 -- aimed warhead; 13 -- cassette warhead.

Fragmentation Destruction Mechanism. The effect of the impact of the fragment on the target is usually assessed with the aid of statistical models, which describe in detail the configuration of the target and location of its main vulnerable compartments; the parameters of the warhead (size and number of fragments, speeds and angles of their scatter, etc.); conditions under which the missile reaches the target (speeds, approach angles, position of the point of warhead explosion).

Usually the following characteristics are revealed in the modeling process, analysis of which makes it possible to calculate the degree of target destruction: depth of penetration (considered the main index); depth of penetration in combination with configuration of the holes (determines the efficiency of the effect on a large number of target elements -- cables, control circuits, hydraulic systems, etc.); amount of movement of the fragment (determines the deformation of target elements); the kinetic energy, which stipulates the dimensions of damage to large targets; the effect of the destruction of the structure as the ratio of the energy of the fragment to the size of the target; and the speed at which the target absorbs the energy of the fragment.

It is possible to increase the probability of destroying an aerial target, in the opinion of Western specialists, by increasing the energy of the fragments. This is attained through the use of large warheads with heavier and faster fragments. Another way of increasing the effectiveness of a fragmentation warhead is considered to be ensuring that a large number of fragments strike the target. In this the effect of accumulated damage is manifested, as a result of which the overall result of the influence on the target turns out to be higher than the simple sum of the individual effects.

If several fragments strike a target in a small area and with a small time interval an additional effect of destruction intensification may arise, due to the following reasons: the overlapping of a series of shock waves developed in the design elements of the target by each striking fragment; explosive reactions of a compound with oxygen on part of the material of the target and fragment, which evaporates when the fragment penetrates (this phenomenon is especially noticeable when it arises in the internal cavities of the target and when the series of fragments causes quasi-static overpressure); and a hydraulic hammer, which arises when fragments strike a fuel tank or other container of liquid.

Judging by foreign press reports, experiments carried out at Messershmitt - Belkow - Blom showed that when a fragment strikes a fuel tank its penetration is insignificant and virtually independent of speed. A series of firings of a 3.5 gram fragment into a container of water at speeds of 600-1,800 meters per second was conducted. It turned out that the maximum penetration was achieved at speeds of 800-1,000 meters per second. At lower speeds the fragment was flattened out, and at higher speeds (above 1,000 meters per second) it took on a mushroom-shaped form and began to erode. Increasing the area of the fragment and reducing its mass led to a decline in the depths of penetration. However, with high speed fragments the container received more substantial damage as a result of the more powerful liquid shockwave.

The time intervals between fragments needed to display the effect of increased destruction depend on the speed at which the shockwave spread in the medium which receives the effect of the fragments (for metal it reaches 10 microseconds; for fluids 100 microseconds, and for internal air cavities 1 millisecond).

Control of Fragment Scatter. Usually a rather wide fragment scatter angle is selected, in order to reduce the requirement for accuracy of maintaining

warhead explosion conditions. Thus many fragments do not strike the target. Their number is determined by the size of the target and the distance from the target of the point at which the warhead explodes.

To obtain increased destructive effect Western warhead designers are trying to form a narrow field of fragment scatter or even provide for parallel fragment movement. They believe that at certain ranges there is some advantage to this. Bar warheads have the narrowest field of scatter of destructive elements; however, they are in limited use, mainly on short range air-to-air missiles (Sidewinder type), which provide high guidance accuracy. The main reasons for the limited use of bar warheads are the low speed at which the ring expands (its increase may lead to the premature destruction of the ring); small destruction radius and insufficient cutting ability of the bars to destroy some hard targets. For example, the bar warhead of the AIM-9C Sidewinder missile has the following parameters: scatter speed -- 900 meters per second; radius of destruction -- 5.1 meters; number of bars -- 144; diameter of one bar -- 4.75 x 4.75 x 266 mm.

A high density of fragments and reduced dependence of their effectiveness on the distance of the target are being achieved through the use of directed warheads. Foreign researchers are proceeding in two directions. One anticipates creating a so-called directional warhead, which has one fixed direction of destruction (usually along the longitudinal axis or at right angles to it). Such warheads require more complicated missile design, since before the warhead explodes it must be turned to make the direction in which the fragments scatter coincide with the target. It is also noted that directed warheads are ineffective against maneuvering aircraft and rapid targets, since present technology cannot carry out a sufficiently rapid turn with the required accuracy immediately before the warhead explodes.

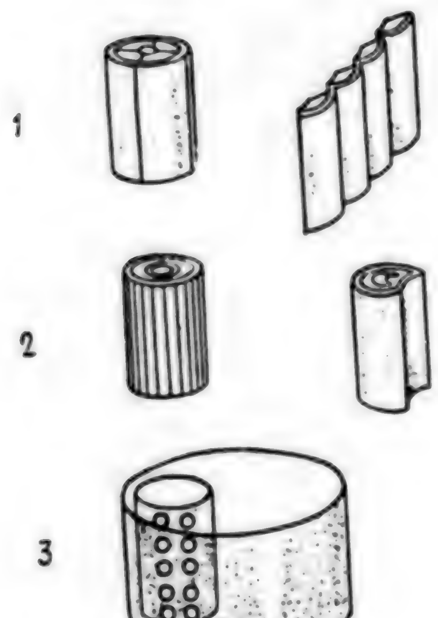

Figure 2. Variants of aimed warheads: 1 -- mechanically deforming (opening quadrant); 2 -- explosive deformation of the charge; 3 -- aimed shock wave

The other way anticipates creating a warhead in which the direction of fragment scatter can be established at the moment of explosion. Such warheads have been called aimed. Two methods of forming the required direction of scatter are being studied: mechanical and explosive (Figure 2). In the first method the four quadrants comprising the warhead open at the moment of explosion toward the target and are triggered. Several milliseconds are required to actuate such a warhead, which limits its use.

In implementing the explosive method two variants are being examined: explosive deformation of the main charge, and creation of a shockwave of the required direction in the explosive charge. Preference is being given to the second method, which is realizable at lower costs and is more promising. It is being reported, in particular, that models of detonators have already been developed which make it possible to form a directed shockwave. In the opinion of Western military specialists, the use of such an aimed warhead along with the creation of a dense stream of fragments directed toward the target makes it possible to increase the speed of the fragments 10-20 percent and correspondingly increase the energy delivered to the target.

The results of research being carried out in the NATO countries show that the main direction for improving the weaponry section of air-to-air and ground-to-air guided missiles in the near future will be the creation of aimed warheads, in which a dense stream of high-speed fragments is formed and aimed toward the aerial target, effectively destroying it. Western experts believe that such warheads are quite promising and their use will provide significant progress in the battle against aerial targets.

9069
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MIRAGE-4R BOMBERS IN FRENCH AIR FORCE

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) p 55

[Article by Col I. Karenin: "Mirage-4R Bombers in French Air Force"]

[Text] According to foreign press reports, the 1st Squadron [eskadrilya], 91st Bomber Squadron [eskadra] (Mon de Marsan air base) of Mirage-4R medium strategic bombers, equipped with new ASMP air-to-ground guided missiles, has entered the active inventory of the French Air Force. The 2d Squadron [eskadrilya] of this squadron [eskadra] (Kazo air base) was to enter the inventory in December 1986. It is planned that the 91st Squadron will have 18 Mirage-4R Aircraft (9 per squadron [eskadrilya]), which will remain in inventory right up to the 1990s.

The Mirage-4R is actually a modernized variant of the Mirage-4A bomber, on which a new sub-fuselage pylon has been built to carry the ASMP guided missile, and improved on-board radio electronic equipment, in particular the Arcana Doppler radar and an inertial navigation system. Data from the latter is sent to the ASMP immediately before launch.

The ASMP (Air-Sol a Moyenne Portee) missile is equipped with a 300 kt nuclear warhead which, the foreign press indicates, is almost five times larger than the French nuclear aerial bombs which the Mirage-4A bombers and the Jaguar fighter-bombers can carry. The missile has a launch weight of approximately 900 kg and is 5.4 m in length. It is launched within a range of speeds of the carrier aircraft of Mach 0.6-0.95. Information on the target is entered in advace into an on-board computer on the missile. In addition, the crew can enter necessary commands for air defense maneuvers just prior to launch. After separation from the carrier aircraft the missile "settles" for several meters. Then the missile accelerator drives it for five seconds to the speed at which it is possible to place in operation the liquid direct-flow missile sustainer engine. The range and flight speed of the ASMP guided missile, judging by Western press reports, depends on its altitude. It amounts to 250 km and Mach 3 at high altitudes and 80 km and Mach 2 at low altitudes.

Besides the Mirage-4R aircraft, plans are to arm the Mirage-2000 fighter-bombers and the Super Etendard carrier fighters with ASMP starting in 1988. The French Air Force tactical aviation command intends to have five squadrons

[eskadriliya] of Mirage-2000N (15 aircraft in each). The Super Etandar will be based on the Foch and Clemenceau aircraft carriers (11th and 17th flotillas; 12 aircraft each).

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RE-ORGANIZATION OF JAPANESE NAVY MINESWEEPING FORCES

[Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 63-64

[Article by Capt 1st Rank Yu. Yurin: "Re-Organization of Japanese Navy Minesweeping Forces"]

[Text] The Japanese Navy command, as it steps up its naval power buildup, is paying particular attention to improving its organizational structure. Thus, in spring 1986 the latest changes were made in the structure of the minesweeping forces of the fleet and the naval areas. After the activation of the 16th Minesweeper Division (MSC 662 (Nuvadzima) and MSC 663 (Etadzima)) in the first flotilla was completed, the 45th division (MSC 640 (Takane) and MSC 641 (Mudzuki)) was resubordinated to the commandant of naval region (Kure). The 41st Separate Division, previously in this region, was disbanded and minesweepers MSC 630 (Takami) and MSC 631 (Uyoo) were placed in reserve, officially reclassified as auxiliary craft and given the hull numbers YAS82 and 83 respectively. Three obsolete ("Kasado") Class ships -- (Mikura), (Karato) and (Risiri) -- were taken out of reserve and scrapped.

At present large units of the minesweeping forces exist both in the fleet (two flotillas of four divisions of coastal minesweepers each) and in the five naval regions -- six separate divisions of coastal and one division of minesweeping boats.

The first minesweeper flotilla includes the headquarters (Kure Naval Base); MST 462 (Hayase) tender (flagship); and the 11th, 16th and 49th (Kure) and 14th (Sasebo) minesweeper divisions. The second flotilla, with its headquarters at Yokosuka Naval Base, consists of the 12th, 15th and 46th (Yokosuka) and 13th (Ominato) divisions and the flagship, the MMS 951 (Soya) minelayer. Four divisions (12th, 14th, 15th and 49th) have three minesweepers each and the others have two each. Overall, fleet minesweeping forces possess 20 coastal minesweepers: 15 ("Hatusima") Class and 5 (Takami) Class; the (Soya) minelayer and the (Hayase) tender. The latter is equipped with an automated minelaying system and can be used if necessary as a minelayer.

Twelve coastal ("Takami") Class minesweepers, contained in six separate divisions of two ships each, and six ("Nanago") Class minesweeping boats, with the MST 474 Uozu escort (101st Separate Division) are subordinate to the naval

region commandants. These forces are distributed organizationally among the five naval regions in the following manner: Yokosuka (42nd); (Kure) (45th; 101st based at Hansin); Sasebo (43rd and 48th at Simonoseki and Kasuren respectively); Maizuru (44th); Ominato (47th, Hakodate).

Japanese minesweeping forces are attached to 5 naval bases: Yokosuka (4 divisions; 10 minesweepers and 1 minelayer); (Kure) (4 divisions; 7 coastal minesweepers, 6 minesweeping boats and 2 escorts); Sasebo (1 division; 3 coastal minesweepers); Maizuru and Ominato (1 division each; 2 coastal minesweepers each), as well as four basing stations -- Hansin, Hakodate, Simonoseki and Kasuren on Okinawa (each with 1 division of 2 ships). Eleven obsolete minesweepers (9 "Kasado" Class and 2 "Takami" Class), which have officially been reclassified as YAS auxiliary ships, are also used, to support the military training of the fleet and naval regions. They actually accomplish the role of MTC [minesweeper forces] reserve ships, and if needed can easily be returned to inventory.

The foreign press has noted that in fiscal year 1986 (beginning 1 April) the two latest ("Hasusima") Class minesweepers -- MSC 664 (Kamisima) and MSC 665 (Himesima) -- were placed in the active inventory of the Japanese fleet. Two new divisions, the 17th and 18th respectively, were activated along with MSC 661 (Takasima) (14th Division) and MSC 660 (Hahadzima) (15th). They are in the 2nd and 1st flotillas respectively. The 46th and 49th divisions will be resubordinated to the commandants of the Yokosuka and Sasebo naval regions. Plans are to disband the 42nd and 48th separate divisions. It is anticipated that the three "Takami" Class ships in these divisions (MSC 632 Miake; MSC 634 Avadzi and MSC 635 Toosi) will be placed in reserve and reclassified as YAS Class auxiliary craft, and that MSC 633 (Utone) will be reconfigured as MST 475 Escort, to replace the obsolete Uozu. Simultaneously, three old "Kasado" Class minesweepers are to be taken out of reserve and scrapped.

Foreign military specialists believe that by spring 1987 Japanese Navy minesweeping forces will have 30 coastal minesweepers: 17 ("Hasusima") Class subordinate to the fleet commander and 13 "Takami" Class found in the naval regions. With respect this, the 11th, 14th, 16th and 18th divisions (8 minesweepers and an escort) will enter the first flotilla, and the 12th, 13th, 15th and 17th divisions (9 minesweepers and a minelayer) will enter the second. The 43rd, 47th and 49th separate coastal minesweeper divisions (13 ships), as well as the 101st Separate Division of minesweeping boats (6 units and the Utone Escort) will remain subordinate to the naval region commandants. In coming years, as "Hasusima" Class ships enter the navy (two of these -- MSC 666 and 667 -- are already under construction; allocations have been made for two more and construction of another five is planned) and the new class 1,000 ton displacement ocean minesweepers currently planned for construction enter the fleet, reorganization of the minesweeping forces will continue. As the organization of new divisions is completed plans are to remove from the

flotillas and place under the naval region commandants divisions of "Hasusima" class ships (11th, 12th, 13th, etc.). Separate divisions of "Takami" Class minesweepers now in the naval regions (43rd, 44th, 45th etc.) will be abolished, and their ships placed in reserve.

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RADIO ELECTRONIC EQUIPMENT OF U. S. NAVY SHORE COMMAND AND CONTROL CENTERS

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[Article by Reserve Capt 1st Rank A. Markov: "Radio Electronic Equipment of U.S. Navy Shore Command and Control Centers"]

[Text] U. S. military and political leaders view naval forces as one of the most important instruments in implementing their adventuristic claims to world domination. Under modern conditions, to accomplish the missions assigned to the U. S. Navy, a fundamentally new structure of the system for operational command and control of its forces was needed, capable of exercising constant control over the situation in the aquatorias of the world's oceans, providing timely and support for the movement of naval groupings through the area of expansion and reliably commanding and controlling its operations there.

In connection with this, the command and control system was already reexamined in the late 1970s and early 1980s. The system was placed on a new conceptual foundation, which anticipates maximum processing of substantively differing types of information at shore facilities, and centralized support for commanders of task forces (groups) and individual ships, only with necessary and previously processed information. The fundamental transformation provided for automating the most labor intensive command, control and communication processes. This problem was solved through the extensive introduction at shore command and control centers of various kinds of technical equipment, mainly computer information complexes, which provide automated processing, depiction and distribution of information. At the present time, in the opinion of Western specialists, this process is basically complete. However, the new technical equipment of the command, control and communications system is continuing to be constantly improved and modernized, in order to maintain it at the level of the requirements of scientific and technological progress.

A substantial amount of computer equipment has been concentrated at the command centers of the fleets, which are the central elements in the U. S. Navy operational command and control system. Thus, while a fleet headquarters computer complex includes 50 or 60 different computers, half of them are intended to support the activity of the fleet command center, at which virtually all information on the situation in the theater is concentrated.

The greater portion is collected and processed by automated systems, which are often not interconnected. The need for the comprehensive use of information is leading to the installation of additional technical equipment, which supports or integrates these systems, or the combining of their information into a separate independent system.

The overwhelming majority of computer systems used in U. S. Navy operational command and control are third generation machines, which is indicative of the rather high level of use of computer equipment in the Navy.

The main basic model computer in the shore centers is the large N6050/6060 computer, which is built on a modular principle, has asynchronous command distribution and includes up to eight processors. It has a substantial amount of operating memory and is intended to collect, process and output to display equipment information on friendly, allied and neutral forces, as well as enemy forces.

The maximum capacity of its main memory device is 512,000 32-bit words; the productivity of one processor is 500,000 operations per second, and that of two is 900,000. Information is transmitted at a speed of 1,300 bytes per second via the input-output circuits, and 3,700 bytes per second with the aid of a multiplexor. From 8 to 24 input-output circuits can be set up to each multiplexor.

Besides the large information machines, Honeywell manufactures a number of small, specialized series H700 computers for carrying out command and control functions. Most widespread are the H716, H725 and some other computers. They are used to prepare information which is displayed on collective use screens and drawn on plotters; to control the exchange of data contained in the mainframes with external subscribers; and to integrate the sources and compilers of information with communication channels. By fulfilling these functions the specialized computers thereby free the central processors and make it possible to use them more fully to accomplish basic computations.

A substantial portion of the information tasks in the shore control centers is accomplished with the aid of small series PDP11 computers from the DEQ firm, which is a main supplier of relatively high-capacity and simple to operate small computers for the U. S. Armed Forces. The PDP11/70 computer is a representative of this series. The capacity of its operational memory device is approximately seven megabytes. However, according to U. S. military specialists, it is being used successfully in the extremely high information capacity fleet command center system to process informal reports. The system receives textual reports, registers them, records, sorts, and compiles them, and delivers them on request to a display screen or communication line. Its bank of machines includes two PDP11/70 computers, each of which has three memory devices on magnetic tape and three on magnetic disks. This makes it possible to process up to 2,400 reports per day. The system contains 16 displays.

The same computers are used in the communications and analysis groups of the Ocean Surveillance Information System (OSIS). They receive and permanently

store in their memory devices information about all objects on the Atlantic or Pacific Ocean Theater for 12 days.

According to Pentagon specialists, Honeywell computers no longer fully satisfy present requirements for effective processing of large masses of information in minimum periods of time. In the next 10 years plans are to replace them by standard computers of a new type, which, according to the foreign press, will most probably be super large fourth generation S80 computers manufactured by IBM. It is anticipated that standard computers will be set up at all shore facilities, which will be included in a single information network. Those presently existing computers, and new ones, including the very promising VAX-11/780 DEQ minicomputer, will be used to accomplish independent specific tasks. The capacity of its operating memory device is eight megabytes, and it has a quick-response speed of two million operations per second. DEQ is continuing to improve its machines to increase their speed to six million operations per second and create elements which both substantially surpass the memory capacity of operational devices, and reduce the time required to select information.

Future plans are to equip command and control systems with large computers having a capacity of 100-300 million operations per second and internal memory of 1,500-2,000 megabytes, as well as with minicomputers with a capacity of tens of millions of operations per second and memory of 10-15 megabytes.

Computer terminals are located at headquarters; the bulk of them are found in command posts. They assist in command and control, monitoring the activity of objects and depicting and documenting information. The display is the most widespread terminal device. It is a general purpose device, which provides remote input and output of information to and from the memory device, visual display on one or several screens in alphanumeric or graphic form, and the capability for operator analysis of a mass of information. The display is the central component of the work station of the operator of virtually any automated system. This is the place where appropriate communication lines link up with the computers and external consumers of the information, operation with which is provided by control signals.

Teletypes and electric typewriters that operate at speeds up to 25 characters per second are used as printing devices, as are line by line printing devices (which print a line or group of lines immediately), the speed of which is 160-180 characters per second. Plotters are used to document the graphic information. They employ electromechanical and electronic methods of registering graphic information on a 1,200 x 1,800 millimeter tablet.

At present, lárge screens with projection portrayals from transparencies and films and acetate film have become widespread in collective visual information display devices. They have high resolution, good illumination characteristics, it is easy to obtain a colored picture on them and store information for a long period of time, and they are easily combined with a cartographic background. However, they are complicated to operate and a substantial amount of time is required to prepare the transparencies.

Microfilming equipment, both for documents and for information coming directly from computer output, is widely employed in information reference systems. Various copying devices, which make it possible to make black and white and colored copies, as well as to increase or decrease their size, are mandatory accessories for these systems.

Means of communication, as an integral part of any control organ, include telephone, telegraph and digital communications gear, which is concentrated in communication centers that serve corresponding command and control centers.

The U. S. Department of Defense automated telephone system, AUTOVON, encompasses virtually all U. S. Navy headquarters and control posts. Through this system they are linked with any other center, regardless of its location. The local automatic telephone station supports the internal and external telephone communications of each independent command and control center. All automatic telephone stations for subscribers defined in a special order have outlets by radio and satellite communication systems to naval forces at sea, and through the AUTOVON system automated switchboard, to the combined communication system of the U. S. Department of Defense. High level officials are given closed telephone communications.

The telephone network is equipped with a standard apparatus, which satisfies the demands for reliability and effectiveness of command and control. At headquarters mostly telephone apparatuses with push button dialing are used (for command personnel there is an automated dialing device for 24 or more subscribers). At command posts switchboard type telephone apparatuses are set up, to which, in addition to the automatic telephone stations, direct communication lines with the command and coordinating centers are installed.

Telegraph and facsimile communications provide information exchange among control centers in printed and graphic forms. Telegraph and facsimile apparatuses are set up in communication centers or at specially assigned facilities in command and control centers. Electromechanical telegraph apparatuses (speed: 10-25 characters per second) are used to exchange informal information and, as a rule, have a direct input into a communication line. Electronic telegraph apparatuses (Telex), which have a higher operating speed (up to 90 characters per second), are used on high speed communication lines and for retrieving information from computers. Due to the noiseless printing device, they can be set up at operator work stations in command posts. Facsimile devices make it possible to transmit graphics, tables and diagrams on forms 216 x 356 mm in size, as a rule in black and white, in 3-6 minutes.

Switching centers are equipped with automated systems which manage the stream of telegraph reports. They have processors which, depending on the addressee and degree of urgency of the correspondence, as well as the operating regime of the communication equipment, automatically determine the priority and most efficient communication channel. Automated switching devices are installed in the main U. S. Navy communication centers. They make it possible to sort all reports received and issue them in a definite priority, either to terminal devices for local subscribers, or for transmission on appropriate

communication channels. Two Spectra 70/45 computers (primary and reserve) support the operation of the system. Eighty-two telegraph channels, 2 high speed channels, an optical scanning device and up to 10 subscriber stations can be connected to each of them.

Due to the specific nature of communications with submarines, independent switching centers have been set up at the command posts of fleet submarine forces. They are based on the Univac AN/UYK-20 processor through which a program for a channel of circular transmissions to submarines is established, as well as reception and reproduction of all correspondence which arrives from headquarters, task forces and individual submarines.

During the 1980s there has been a sharp increase in the volume of digital communication lines used to support the exchange of data between computers in control centers. Communications among command posts of shore establishments are carried out on the AUTODIN automated digital communication system, and communication with submarines through the FLEETSATCOM satellite system, with the aid of special modules. Modules for communications with submarines and mobile antisubmarine warfare surveillance forces have been developed and are widely used. Preparations are underway to shift to digital communications between shore and flagship command posts.

According to the foreign press, in recent years a fourth method of communications, according to the American terminology, has begun to be used -- transmission of graphics. Essentially, tables, graphics and diagrams with corresponding numerical and alphabetical designations and number fill-ins, as well as ordinary text or digital combinations in the form of formulas are recorded on the memory device and transmitted through communications equipment. The subscriber who receives the transmitted signals, depicts them on his display screen and uses them for his purposes.

Technical communication systems and resources are concentrated at U. S. Navy communication centers. Main zonal communication centers, which control and support communications within the zones of the operational U. S. Navy fleets, are rather large facilities, which have a complex organizational structure and technical equipment. The main communication centers are located at the main naval bases (Norfolk, Pearl Harbor, Naples) and include centers for telephone and telegraph communications, centers for encoding and switching communication lines, and satellite and radio relay (or tropospheric) communication stations. Reception and transmission centers are located separately at a distance of 30-50 km. There are 100 or more radio transmitters of various frequencies in the transmission centers, controlled by switching lines from the telephone and telegraph centers. The technical equipment found at communication centers at naval and air bases and fleet basing stations depends directly on their purpose and the forces which they serve (40-60 radio transmitters and receivers on average).

Future programs for the development of U. S. Navy command and control systems envision their transition in the next few years to fourth generation computer equipment; introduction of the achievements of the electronics industry into graphics depiction devices and systems for combining and transmission of data and communication circuit switching; as well as improving the reliability of

the equipment of shore-based organs to a state which will support the command and control of naval forces under any combat conditions.

It can be seen from everything stated above that the U. S. Navy, to support the rapid and reliable effective command and control of its forces at sea, pays constant attention to improving its command and control system, through extensive automation of all command, control and communication processes, based on modern electronic equipment.

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BRITISH 'NORFOLK' CLASS GUIDED MISSILE FRIGATES

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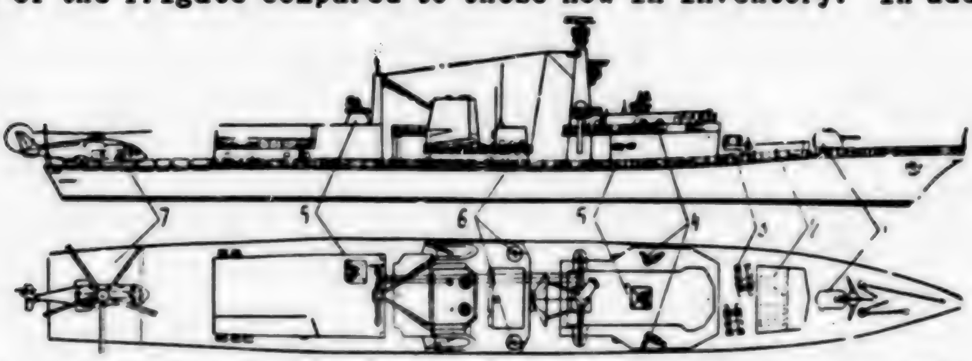
[Article by Capt 1st Rank Yu. Petrov: "British 'Norfolk' Class Guided Missile Frigates"]

[Text] The naval forces of Great Britain have always been and remain an important means of implementing the aggressive designs of the country's ruling circles. Therefore, continuous attention is paid to building up their combat power. Thus, in October 1984 the (Yarrow) firm was given an order to build the lead guided missile frigate Norfolk (Class 23, see sketch) of a series of ships of the same name, which in the future, along with the "Broadsword" Class guided missile frigate, will become the foundation of the fleet's surface antisubmarine warfare forces.

A search has been going on since the 1970s for the optimum class of frigate to combat future nuclear submarines. The developers had to create a fighting system (ship, weapons, electronic equipment) capable of operating in the North Atlantic under any meteorological conditions and at any time of year. Taking into account the experience of the military conflict in the Falklands (Malvinas) an additional requirement was levied to increase substantially the range of the frigate compared to those now in inventory. In addition, the



Sketch of "Norfolk" Class Guided Missile Frigate: 1 -- 114 mm Mark 8 artillery mount; 2 -- mount for vertical launch of Sea Wolf AA Guided Missile; 3 -- Harpoon Anti-Ship Missile launch platform; 4 -- Sea Gnat electronic warfare launch system; 5 -- 911 RLS [radar] antenna; 6 -- Erlikon 30 mm artillery mount; 7 -- EH. 101 Helicopter.

designers were instructed to reduce its physical fields (especially acoustic and thermal) and effective scattering surface. The project envisions the construction of a multi-purpose ship which, besides its main function, will be able to combat effectively aerial and surface targets under conditions of an intentionally complex operational environment. The number of ships in this series has not yet been determined and, according to foreign press data, may vary from the initially planned 15 to 8 or 9 units. This is associated most of all with a substantial increase in the cost of building the frigate, from 67 million pounds sterling, as was anticipated at the start of the 1980s to 200 million (in 1984 prices) at present. Plans are to build the ships at the wharfs of the Yarrow firm in Glasgow, and Swanhunter in Wallsend. The project is to have subsequent modernizations to equip the frigate with the newest weapons systems. In connection with this, the weapons on the latest ships in the series will probably differ from those of the first.

Computer-aided design was used in developing the ship. This made it possible to build a hull with optimal sea-going qualities (having correspondingly better conditions for weapons employment), and then to modify it to improve its other specifications without substantially reducing the sea-worthiness.

During the designing the hull of the Amazon frigate was used as a base. It possesses good sea-worthiness, but has relatively high hydrodynamic resistance. Subsequently all efforts were directed at reducing this resistance. Research showed that the shape of its bow has a more noticeable influence on the sea-worthiness of the ship than that of its stern. Therefore, the former, with its small rise, V-shaped lines and clipper bow was left unchanged. The hull has a large waterline coefficient and a wide submerged transom stern with a smooth transition to the nose section. The maximum width and draft remained as before. Calculations and tests of models confirmed that at speeds above 20 knots the hydrodynamic resistance would be smaller for the "Norfolk" Class frigates and at lower speeds it would be smaller for the "Amazon" Class frigates. The new ships have less roll and pitch, required effective power output at speeds above 20 knots and upper deck wetness in high seas. The reduction in pitch also reduces slamming and makes it possible to maintain high speed in waves. The design took into account requirements for speeding up and simplifying construction without reducing quality. Thus, the number of sections and construction connections in the frigate were reduced by comparison with other ships of the same displacement, and in a number of places, instead of the more complex and costly standard admiralty profiles, plans are to use beam lists used in civilian ship construction. Particular attention will be paid to aggregates with higher voltage concentrations, to reduce the need for maintenance and repair.

The new ship will have a welded smooth deck hull and a steel three section (according to some information, two section) superstructure. Tower masks are being erected above the bow and stern sections, and a smoke funnel over the middle section. A hangar for helicopters and adjacent takeoff and landing area has been prepared in the stern section. The motion stabilization section includes steering rudders and deep bilge keels.

A complex of design decisions has been implemented in the project to improve ship vibration and acoustic characteristics, protection against weapons of mass destruction, and fire safety. Equipment noise is reduced through careful control during the manufacturing process, as well as by installation on detached foundations and sound isolation supports. In addition, rudders and edges of propeller blades will be air-blasted. Propulsion motors will be without reduction gears; plans are to join them directly to the propeller shafts. To improve fire safety and prevent the spread of smoke, the hull will be divided into five sections with autonomous ventilation systems.

The design provides for creating citadels with excess pressure and filter ventilation systems, as well as equipment to process liquid and solid wastes, thus preventing water pollution.

Individual, most important compartments on the ship and some superstructures must have armored protection. Plans are to increase its combat capabilities and reduce crew size by increasing the degree of automation, simplifying operation and accelerating repair. Full scale modeling of the conning bridge and combat information post was carried out with consideration for ergonomic factors. The main specifications of the ship are listed below:

Displacement, tons:

full	3,700
standard	3,000

Main dimensions, meters:

greatest length	133
width	14.8
draft	4.3
Full speed, knots	28
Range, miles (at speed, knots)	7,000 (17)
Crew	143

Requirements placed on the frigate's power plant were for minimum noise (especially when operating in the submarine search regime), as well as a full speed of 28 knots and cruising speed of 17 knots for a range of 7,000 miles. To satisfy tnese requirements a twin-shaft combination diesel-electric gas turbine power plant was selected. Because the main sources of structural noise on the ship are tne propulsion reduction gear and the propellers, a direct current (3,000 horsepower) propulsion motor is joined directly to the shaft line and a fixed screw has been designed which takes into account the requirements for low noise. The electric engines with thyristor control are to be fed from four alternating current diesel generators operating in parallel (12 cylinder Paksman Walenta No 12 RPA No 200 CZ diesels with 1,770 horsepower capacity each), installed on sound isolating supports. The

generators also feed the ship-wide electrical network through mechanical converters. To reduce noise two diesel generators may be mounted on the superstructure behind the smoke funnel. To reduce the moment of inertia when the gas turbines are turned on the electric engines will not be decoupled from the shaft but will receive power and continue to operate. The electric power plant generates a current of 660/440 volts with centralized monitoring and control of its distributor, including automated load regulations, synchronization, and startup and stopping of generators. The control system uses a D86 microprocessor, based on which the control system of the main power plant has also been developed.

Two (Spay) SM1A 17,000 horsepower Rolls Royce gas turbine power plants provide full power. They function on the propellers through a quiet, two-stage irreversible reduction gear with a built-in self-stabilizing coupling box. In the quiet regime the reducer can be detached from the shaft line and locked. It is a duel-shaft power plant with a two-stage power turbine and RB244 gas generator weighing 1,400 kg, which is easily exchanged during repair. The latter includes low and high pressure compressors respectively with 5 and 11 rows of blades, as well as 2 two-stage turbines. The nozzle chamber and operating blades of the high pressure turbine are cooled by air driven from a high pressure compressor. The air goes into an air distribution chamber from the reception branch pipe to create an equal current.

The power plant, which is placed on the ship in the form of a single module weighing 25 tons with dimensions of 750 x 229 x 339 centimeters, includes a power turbine, gas generator and air intake and gas exhaust branch pipes. It is sound insulated and affixed to cushioning supports.

The entire power plant is paced in four compartments. In the first (bow) are two diesel generators and a mechanical transformer; in the second are two gas turbine plants; next are the two main reducers and finally are two diesel generators, propulsion motors and a mechanical transformer.

To improve the survivability and reliability of the ship command and control system plans are to install an ASU [automated control system] (based on the Ferranti 1,600E computer). Weapons systems and separate equipment are linked by multiplex data transmission lines with standardized multi-purpose ASU data depiction devices, the architecture and functional construction of which make it possible to change configuration and, consequently, accomplish command and control tasks in the event that individual sections of the system are knocked out or there is an accident in the BIP [combat information center].

For antisubmarine warfare and target designation two Links-HAS.2 antisubmarine warfare helicopters will be based on the frigate. The maximum takeoff weight of the helicopters is 4,760 kg, range is 600 km and cruising speed is 232 km per hour. They are armed with two 324 mm small-size Stingray antisubmarine torpedoes (hydro-acoustic active-passive self-guidance system); Sea Cobra antiship missiles (range 20 km; weight 210 kg; warhead weight 20 kg; semi-active guidance system); a small RLS [radar] for target search and tracking and controlling missile firing; a GAS [hydro-acoustical system] with a submersible antenna and hydro-acoustic buoys. Possibly, instead of this helicopter, the EH.101, developed jointly by firms in Great Britain and Italy,

will be used. It has substantially greater takeoff weight (13,000 kg); its radius is increased to 920 km with a load of 6,600 kg; its cruising speed is 160 km per hour and it has a search time of approximately 5 hours. According to foreign specialists, these operating and technical characteristics, combined with greater cabin area (15.5 square meters), will make it possible to place all necessary weapons on the helicopter.

In the stern superstructure of the frigate (in front of the hangars) two stationary single-tube 324 mm torpedo apparatuses (or 1 three-tube apparatus) will be installed side by side. They will fire Stingray antisubmarine torpedoes.

Plans are to equip this ship with a low frequency active-passive type 2050 GAS, to search for submarine targets, classify them and issue targeting instructions to ASW weapons. It is planned that the passive section will be used, in particular, for torpedo detection. The GAS 2031 with towed linear antenna array (speed 6-8 knots) will also be provided.

To combat air attack weapons plans are to put a 32-container vertical launch platform (UVP) in the nose section with Seawolf defended object air defense guided missiles which will additionally be equipped with approximately one meter long boosters. This will somewhat increase the weight of the ZUR [air defense guided missile], but on the other hand will up its firing range to 7.5 km. The apparatus is not mounted flush with the upper deck, which frees the below-decks spaces for ammunition stores and living areas. The vertical launch platform (UPV) increases the survivability of the system and the amount of ammunition, reduces reaction time and the number of maintenance personnel and makes it possible to combat several aerial targets operating simultaneously from different directions. Number 911 radar antenna systems will be installed on the bow and stern superstructures for guidance of the Seawolf ZUR, which will track low-flying PKR [antiship missiles].

No final decision has yet been made about placing a small caliber air defense artillery system (ZAK) on the frigate. Foreign specialists believe that on the first ships 2-4 one-tube 30 mm artillery platforms will be mounted on the sides of the superstructures, and later they will have 2 seven-tube Goalkeeper ZAK.

To combat surface craft plans are to arm the frigate with 2 four-container Harpoon PKR launch platforms, located between the bow face of the superstructure and the UVP. The missile has a combined guidance system (inertial and active radar), near supersonic speed of Mach 0.85 and maximum range of 130 km, which is maintained at a low altitude trajectory by the AN/APN-194 radar short-impulse altimeter. The launch weight of a missile with accelerator is 680 kg; the weight of a high explosive type warhead is 225 kg.

A 114 mm one-gun general purpose Mark-8 Vikkers turret artillery platform will be located in the bow of the ship. British specialists believe that this weapon will be in inventory until the end of this century. Light metals were widely used in its design. To decrease weight the turret was manufactured from fiberglass. The systems of the artillery mount use non-contact switches,

transistors, electrical and hydraulic interlocking devices and replaceable modular assemblies, which facilitate detection and elimination of malfunctions. Fifteen combat ready rounds are located in a drum-type magazine. Firing is automatic at a speed of 25 rounds per minute, and can be begun no later than 15 seconds after an order is given. Subsequently it is possible to maintain a constant rate of fire and fire 90 rounds in 7.5 minutes. Tube life is approximately 5,000 rounds. Maximum range is 22 km and altitude range is 12 km. The elevation angle is from -10 to +55 degrees. The moderate rate of fire and simplicity of the automated ammunition feed system with low speed and acceleration of moving parts have increased the reliability of the mount, according to foreign sources.

After the publication of tactical and technical specifications of the ship, critical comments appeared in the Western press relative to the distribution of weapons on the ship, since, except for antisubmarine weapons, they are located only in the bow part of the frigate.

The three coordinate 996 medium range radar will become the main ship-borne means of interpreting the situation. It has high resolution and is able to detect targets with small effective surfaces of scatter under conditions of intensive electronic warfare. The station antenna is stabilized and is combined with the antenna of the "friend - foe" recognition system. The radar tracks targets during scanning and data about the most important targets are automatically transmitted to the gun control system. A type 1007 navigation radar will also be used, to provide command and control of helicopter flights.

Plans are to equip the frigate with an automated system for observing the radiation, chemical and biological situation; means of communication which cover the standard frequencies from low to ultra high; and terminals of the SATCOM space communication system, with means of automatic distribution and information prioritization.

Ship-borne electronic warfare resources will include an RTR [as written] system with a modern digital data processing system, which covers 360 degrees and compares signal characteristics with 2,000 target signatures in a range of 1-18 gigahertz in its data bank. The system is combined with four 6-tube Sea Gnat guns for launching false targets, which are located on the sides of the bow superstructure.

According to the foreign press, in 1985 orders were issued for construction of the first two ships, and in 1986 three more orders were issued. Future plans are to maintain construction of three frigates per year.

9069
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FINANCING U. S. MILITARY EXPORTS IN THE 1980S

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 82-86

[Article by Lt Col Yu. Malkov and A. Zinchenko: "Financing U.S. Military Exports in the 1980s"]

[Text] As the 27th CPSU Congress noted, imperialism has created and organized a refined system of neocolonialist exploitation and superexploitation of the peoples in the developing countries. Military economic ties are an important element of this system. Through these ties the U. S. and the other developed capitalist states are attempting to achieve a duel objective. On the one hand, by strengthening their allies from among the developing countries militarily, imperialism is implementing its global military and political plans. On the other hand, the world capitalist weapons market has already long turned into an integral part of the military economy of the U. S. and NATO, which makes it possible, by pumping the financial resources of the countries that purchase weapons and military equipment, to strengthen their own military industry and improve the level of its mobilization readiness.

The rapid growth of U. S. military exports in the last 10-15 years, reinforced by the competitive struggle between the weapons exporting countries and the extension of the list of military equipment being sold toward modern, technically complex models, caused the creation of a far flung mechanism of state monopoly regulation in this field. It functions based on laws controlling weapons exports and assistance to foreign states. Pursuant to the legislation the financing of military deliveries abroad is one of the most important functions of this mechanism.

Financing of military exports means granting monies in various forms to the importing country so that it can pay for the weapons it purchases. They may be allocated as credit or free of charge (subsidized). In contrast to the other NATO countries, where financing of exports, including military exports, is handled primarily by private banks, in the United States the state plays the leading role. The funds allocated are earmarked to pay for weapons deliveries exported both by the state and by private firms. Financing the training of military and technical personnel, deliveries of spare parts and ammunition (except for initial sets) as well as financing programs for joint

weapons production, as a rule is not done. It is not authorized to use sums received to repay debts for credits obtained in past years.

State export credits are "linked;" i.e., the funds allocated must be spent in the U. S. Moreover, using the credits to purchase models of U. S. military equipment which contain more than 49 percent aggregates and parts of foreign manufacture is not permitted. As an exception purchases may be authorized on the strength of credits outside the U. S. In 1982-1985 such exceptions were made only for Israel, El Salvador, The Philippines, Somalia and Greece. The largest were for Israel, which by decision of the U. S. Congress was authorized for the Lavi fighter construction program to expend American monies to acquire military goods and services at Israeli firms. During fiscal years 1984-1987 the United States allocated approximately $750 million for these purposes.

Legislation provides for granting purchaser countries two main types of export credits: direct state credits and credits guaranteed by the state. In the first case funds for credits are allocated within the framework of the annual appropriations for military purposes directly from the U. S. Department of Defense Budget. In the second case the government, in the person of the Secretary of Defense, issues guarantees for export credits of the Federal Credit Financing Bank (FKFB). For this purpose, in 1974 the Department of Defense created a guaranteed reserve fund, which ensures that the bank will receive debt payments for export credits if purchaser countries are unable to pay. The FKFB, which is subordinate to the Treasury Department, accumulates funds for providing credit for export operations through loans made on the private market, as well as from the U. S. Treasury.

The mechanism for coordination between the fund and the bank is as follows. If loan payments are delayed for more than 10 days the Department of Defense must reimburse the bank from fund monies the full amount of its loss. The debtor country, nevertheless, is not freed from the requirement to pay back the loan. Moreover, it must pay an additional four percent as a fine. In addition, the FKFB, with the concurrence of the Department of Defense can require early repayment of the remaining amount of the debt and interest.

In 1981 the U. S. Congress adopted the so-called "Brook Amendment," which deprives a debtor country of the right to obtain new state funds if it has debts more than one year overdue.

Initially the amounts of the guaranteed reserve fund were limited to 25 percent of the overall amount of FKFB credits. Then its amounts were reduced to 10 percent, and in 1982 the limitations were entirely abolished. At present there is a statute in effect according to which needed resources are directed into the fund from annual appropriations when it goes below $750 million. Thus, as a result of the fact that in fiscal year 1984 fund reserves declined to $552 million the next year appropriations in the amount of $109 million were allocated to it.

The reduction of funds in the guaranteed reserve fund caused, first of all, a difficult currency situation in the majority of the countries which purchased American weapons, and the inability of their economies to repay their military

debts. By early fiscal year 1985 the overall amount of payments from the monies in the fund for overdue obligations to FKFB reached $1.7 billion. To ensure returns on debts the U. S. is granting extensions to the debtor countries. As a mandatory condition for re-examining the debt payment terms the debtor must accept the conditions of the International Monetary Fund for stabilization of its financial situation. In fiscal years 1978-1985 the United States re-examined debt payment terms for credits of past years totalling more than $840 million.

Difficulties in receiving credit debt payments forced the U. S. administration to reorganize of the system for financing military exports partially and to soften the conditions under which credits are granted. Beginning in 1985 issuance of new credits through FKFB was halted. In the future funds for these purposes will be allocated only through the use of direct government credits. The number of countries authorized to receive credits under favorable conditions (low interest, longer terms) has been sharply expanded. The amount of monies granted charge-free has been increased.

U. S. legislation gives the administration broad authority in the field of regulating the conditions of export credits. The Department of Defense is authorized to grant credits for a period of up to 12 years, and a preferential period up to 5 years is provided for, during which the debtor country pays only the interest on the loans. The loans are repaid, as a rule, in semi-annual payments. Interest on export credits is established at the level paid by the Treasury Department for domestic loans with similar repayment terms, and is closely tied to fluctuations in the discount rate of the Federal Reserve system. During the first half of the 1980s its level fluctuated within 10-15 percent. However, the granting of credits at lower interest rates is authorized by legislation. In this case the rate is established at a level of 5-6 percent. With congressional approval longer credit repayment terms up to 30 years, with a 10 year preferential treatment, are also permitted. During fiscal years 1986-1987 such credits have been provided for Greece, Spain, Portugal, Thailand, Turkey and South Korea.

In some cases the U. S. completely frees the weapons-purchasing country from repayment of credits, thereby turning them into permanent loans or subsidies. This form of financing is intended only for "closest allies" -- Israel and Egypt -- which currently receive more than half of the funds which the U. S. directs toward financing military exports. In addition, such subsidies are granted to countries which play an important role in U. S. military and strategic plans. Weapons deliveries to pro-American regimes in El Salvador and Honduras are financed in this way. Data about the monetary costs of financing U. S. military exports are shown in the table below.

According to foreign press reports the procedure for allocation of monies consists of several stages. In the first stage the Department of Defense determines possible financing requirements of countries purchasing U. S. weapons. Following consultations with the Department of State, at the beginning of each fiscal year monetary estimates are sent to Congress for approval. After approval a credit agreement is signed between the Department of Defense and the purchaser country, which stipulates the conditions under

which funds are granted. In the next stage the purchaser country distributes the allocated funds according to specific program purchases.

Financing of U. S. Military Exports in Fiscal Years 1984 - 1987
(in millions of dollars)

Credit Receiving Country	Fiscal Year			
	1984	1985	1986	1987
Total:	6440	5801	5767	6726
Credits	4372	2365	2000	2561
Subsidies	2068	2436	3767	4165
Including:				
Israel:	1700	1400	1723	1800
Credits	850	-	-	-
Subsidies	850	1400	1723	1800
Egypt:	1367	1177	1246	1302
Credits	900	-	-	-
Subsidies	467	1177	1246	1302
Turkey:	718	704	618	824
Credits	585	485	409	600
Subsidies	133	219	209	224
Greece:	501	501	432	502
Credits	500	500	431	500
Subsidies	1	1	1	2
Spain:	403	403	385	403
Credits	400	400	383	400
Subsidies	3	3	2	3
Pakistan:	301	326	312	341
Credits	300	325	311	340
Subsidies	1	1	1	1
South Korea:	232	232	165	232
Credits	230	230	163	230
Subsidies	2	2	2	2

For the majority of purchaser countries state export credits are earmarked; i.e., the funds are directed to finance a strictly defined contract, and in its full amount. Only for Israel, Egypt and Turkey has a special distribution system been established. Funds allocated by the United States enable them to purchase simultaneously weapons and military equipment in an amount which exceeds the ceiling of the credit agreement. These countries, which receive monetary resources from the U. S. on a permanent basis, are authorized, when distributing funds among specific contracts, to finance only the requirements of the first year in which the contract is implemented, and to direct the remainder of the funds toward financing other transactions. Owing to this, in fiscal years 1979-1981 the U. S. sold Egypt weapons and military equipment for a sum of $3.5 billion, having granted credit for only $2.05 billion.

Along with the stated financing channels, the possibility of granting credits from other sources to countries which purchase American weapons is also not excluded. The U. S. Export-Import Bank, for example, is authorized by law to issue credits and credit guarantees for the purchase of weapons by developed countries. However, at the present time this channel is scarcely used.

Purchaser countries are authorized to obtain credits to pay for weapons deliveries from private banks. Nevertheless, this source of financing has not become widespread. This is associated primarily with the high interest on private export credits (it averages 2-4 points higher than for government credit). Thus, in 1982 the possibility was examined of granting Pakistan private credit for seven years with a two year preferential period, at 12 percent annual interest. At the same time, similar credit through FKFB for 12 years included a 3 year preferential period and interest of 10 percent. Therefore, private funds are used extremely rarely. The largest operation of this type was the credit offered in 1986 by a consortium of American private banks to Greece in the amount of $1.3 billion, for purchase of 40 F-16 tactical fighters. By taking this step the Greek Government attempted to minimize the U. S. ability to make use of the credit to exert direct political pressure on Greece during negotiations about American military bases on Greek territory.

The system of financing U. S. military exports is directed most of all at expanding the sale of American weapons in the developing countries. In contrast to the developed states, which have military budgets large enough for them to finance purchases of modern models of military equipment, the majority of developing countries lack their own financial resources. Therefore, serious financial and economic problems arise when they purchase costly weapon systems. At present, the amounts of individual transactions may reach several billion dollars. This substantially surpasses not only the military budgets of many developing countries, but also the capabilities of their national economy. Since the end of 1985, in connection with the sharp drop in oil prices, even the rich oil producing countries were forced to give up partially the practice of paying for weapons with cash and began to resort more often to financing their military imports through foreign financial resources.

Thus, the financing of weapons exports is substantially expanding the capabilities of the developing countries to purchase modern models of weapons and military equipment, which otherwise it is unlikely they would be able to obtain. Thus, a contract included in 1984 for the delivery of 160 F-16 tactical fighters to Turkey for more than $4.3 billion became possible only through the extensive use of various forms of financing. The overall amount of the transaction was almost twice the size of Turkey's military budget for that year.

Meanwhile, behind the seeming simplification and facilitation of weapons imports by the developing countries is concealed yet another means of their financial enslavement. As the foreign press indicates, the problem of foreign debt is one of the most acute problems of the liberated states, the economies of which need currency to pay for importing food, machinery and equipment. By also purchasing weapons and thereby diverting significant material resources from economic development goals, they fall not only into military and political, but also financial dependence on the U. S., which in the aggregate virtually deprives them of the capability to conduct an independent domestic and foreign policy and leads to the loss of national sovereignty. By the beginning of fiscal year 1985 the overall amount of indebtedness of 43 countries for U. S. military credit (including interest) was more than $61 billion; the 7 largest debtors owed more than 92 percent of this amount.

The increase in the discount rates at the start of the 1980s seriously complicated the problem of foreign debt of the developing countries. This automatically impacted on the interest paid on credits granted for the purchase of weapons and military equipment. During 1981-1983 rates for export credits at times reached 15 percent. Calculations made in the foreign press show that an importing country which receives credit in the amount of $100 million at this rate for a 10 year period pays in the end for the weapons obtained more than $180 million (taking into account interest payments).

The situation in which Egypt found itself, after having received credits totalling $4.5 billion by the beginning of fiscal year 1985, can serve as a real confirmation of the above calculations. The average interest was 13-14 percent, and the time period granted for the credits was 30 years. As a result, Egypt's total debt payments shall exceed $14 billion, and by the mid-1990s annual payments will increase to $700 million.

In the mid 1980s the annual debt payments by countries that have purchased American weapons reached $3.5 billion. Interest payments alone are nearing $1.5 billion. The increase in payments on the credits of past years has become one of the prerequisites which enabled the U. S. to ease substantially the conditions under which its military exports are financed, increase the amount and share of funds granted free of charge, somewhat reduce the interest rates on credits and increase the number of countries which receive them on preferential interest rates. It should, however, be emphasized that virtually all the advantages from this were received by the closest allies of the U. S., and this made it possible to increase still further the concentration of financial resources on the three largest recipients -- Israel, Egypt and Turkey. During fiscal years 1986 and 1987 it is expected that they will be

allocated more than $7.5 billion for weapons and military equipment purchases, or more than 60 percent of the overall funds allotted for these purposes.

The majority of states which purchase American weapons on credit are experiencing difficulties in repaying the debts. Only the "strategic ally" of the U. S. in the Middle East, Israel, is freed from this problem. A special system has been developed for financing American military deliveries to this country. It is called upon to provide all the requirements of Tel Aviv in this field.

First, Israel is the largest recipient of funds free of charge. From Fiscal Year 1974 through Fiscal Year 1985 she was granted $8.5 billion for the acquisition of American weapons under such conditions.

Second, the overwhelming majority of weapons purchased in the U. S. are paid for through American financial resources. During the period indicated Israel was allocated approximately $18.3 billion for these purposes, and beginning in 1985 all sums have been granted free of charge. In Fiscal Year 1987 U. S. subsidies will reach $1.8 billion. In the 1980s Israel has purchased only 10 percent of its military equipment from its own funds.

Third, despite the fact that the Israeli military debt to the U. S. (including interest payments) is assessed at $25.5 billion, and annual payments amount to $1.1 billion, Israel is not among the countries experiencing difficulties repaying this debt. The U. S. is repaying from its own federal budget the annual debt obligations of its "strategic ally." The so-called economic support fund is used for this. It is under the jurisdiction of the Agency for International Development, which is involved in economic assistance to foreign countries. The resources of this fund support U. S. allies experiencing financial difficulties due to inordinate military expenses.

Israel was traditionally the largest recipient of these resources. Until recently the U. S. did not acknowledge openly the direct relationship between the amount of no-charge monies allotted to Israel from the economic support fund and the amount of annual military debt payments. However, in 1984 a statute was officially enacted in accordance with which the annual amount of assistance through this program must equal the amount of payments on the U. S. military debt in the same year or exceed them. Thus, in fiscal year 1984 Israel repaid $904 million of its debt, having received no-charge monies from this fund in the amount of $910 million. In 1985 these figures reached $1.1 billion and $1.2 billion respectively. For purposes of comparison, the amount of assistance from the fund does not exceed 20-25 percent of the annual payments on the military debt of the two other American allies -- Egypt and Turkey.

9069
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AIRFIELD NETWORK OF THE ASEAN COUNTRIES

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) pp 87-91

[Article by Lt Col V. Samsonov: "Airfield Network of the ASEAN Countries"]

[Text] Since the Reagan Administration has come to power militaristic circles in the U. S. have markedly increased the activeness of measures to strengthen and expand U. S. military presence in the ASEAN countries (The Philippines, Thailand, Malaysia, Indonesia, Singapore, Brunei), which are viewed by them primarily as a forward bridgehead for their aggressive actions in the western part of the Pacific and the Indian Oceans. Resorting to blackmail and frightening these countries with the concocted military threat, coming supposedly from Viet Nam, Laos, Kampuchea and even the USSR, Washington is seeking ways to expand opportunities to use the territories of the ASEAN countries for basing and transporting contingents of American troops to Southeast Asia and the Indian Ocean area. In particular, an agreement has been made with the Philippines and an agreement in principle has been reached with Thailand about placing military bases U. S. disposal, should a crisis situation arise in the area. The possibility of using bases on Malaysian territory is being explored.

The U. S. is encouraging in every way the growth of military budgets in the ASEAN countries, is intensifying weapons deliveries, rendering assistance in the training of national military cadres, and is expanding the exchange of military delegations and conduct of joint exercises. In the past five years annual military appropriations by the ASEAN countries increased 33 percent and exceeded 8.3 billion U. S. dollars. A substantial portion of these monies is being spent to improve the infrastructure of these countries, including modernizing and expanding their airfield network. According to information contained in a special reference on aerial navigation information ("Asia, Australasia and Pacific Supplement, 144st Edition, British Airways, 1983"), the airfield network of the ASEAN countries includes 74 airfields with main runways (VPP) 1,800 meters or longer (Table 1). Of the overall number of airfields suitable for basing military aircraft, 37 have runways longer than 2,500 meters; of these, 5 airfields in Indonesia (Medan, Manado, Ujung Padang, Biak and Jakarta) have runways with asphalt cover, and the rest have concrete cover. A brief description of the main airfields is at Table 2.

Table 1
Number of Airfields in ASEAN Countries With Main Runways
1,800 Meters or More in Length

Runway Length (meters)	Phili	Thai	Malay	Indon	Singa	Brun	Total
1,800 - 2,500	10	4	6	17	-	-	37
2,500 - 3,000	5	5	2	7	1	-	20
Above 3,000	2	6	3	3	2	1	17
TOTAL	17	15	11	27	3	1	74

Table 2
Main Characteristics of Airfields in ASEAN Countries With Runways
2,500 Meters Long or Longer

Name of Airfield	Coordinates of Runway Center		Main Runway		Main Radio Navigation Equipment
	N Lat, degr-min	E Long, degr-min	Lgth x width,m	Runway landing heading	
			Philippines		
Clark (Luzon Is.)	15 - 11	120 - 33	3200x45	21 - 201	PRM [homing beacon], VORTAC
Basa (Luzon Is.)	14 - 59	120 - 29	2550x45	30 - 210	PRM, VORTAC
Kubi Point (Luzon Is.)	14 - 48	120 - 16	2750x60	70 - 250	PRM, TACAN
Manila (Luzon Is.)	14 - 31	121 - 01	3350x60 2400x30	61 - 241 130 - 310	PRM, VOR, ILS, RLS UVD
Maktan (Maktan Is.)	10 - 19	123 - 59	2600x45	46 - 226	PRM, VOR, TACAN
Puerto-Princesa (Palawan Is.)	09 - 44	118 - 46	2550x45	90 - 270	PRM, VOR, RLS UVD
Samboanga (Mindanao Is.)	06 - 55	122 - 04	2600x45	90 - 270	PRM, VOR, RLS UVD

Thailand

Chiangmay	18 - 46	98 - 58	2700x40	180 - 360	PRM, TACAN
Udon Thani	17 - 23	102 - 48	3050x45	120 - 300	PRM, VOR, TACAN
Tak Li	15 - 17	100 - 18	3000x45	180 - 36	PRM, TACAN
Korat	14 - 56	102 - 05	3000x45	60 - 240	PRM, TACAN
Ubon	15 - 15	104 - 52	2750x45	50 - 230	PRM, VOR, TACAN
Kampongsaen	14 - 06	99 - 55	2750x45	30 - 210	PRM, VOR, TACAN
Bangkok	13 - 55	100 - 37	3550x60 3000x45	29 - 209 29 - 209	PRM, VOR, RLS UVD
Utapao	12 - 41	101 - 01	3500x60	184 - 004	PRM, TACAN
Surat Thani	09 - 08	99 - 08	2500x45	40 - 220	PRM
Phuket	08 - 07	98 - 19	2500x45	90 - 270	PRM, VOR, RLS UVD
Hat Yai	06 - 56	100 - 25	3050x45	80 - 260	PRM, VOR, RLS UVD

Malaysia

Pinang	05 - 18	100 - 17	3350x45	40 - 220	PRM, ILS, RLS UVD
Kuantan	03 - 46	103 - 13	2800x45	180 - 360	PRM, scanning RLS
Kuala Lumpur	03 - 08	101 - 33	3500x45	150 - 330	PRM, VOR, RLS UVD
Johor Baharu	01 - 38	103 - 40	3350x60	160 - 340	PRM, VOR, RLS UVD
Kota Kinabalu (Kalimantan Is.)	05 - 56	116 - 03	3000x45	20 - 200	PRM, VOR, RLS UVD

Indonesia

Medan (Sumatra Is.)	03 - 34	98 - 41	2900x45	50 - 230	PRM, VOR, RLS UVD
Batam (Batam Is.)	01 - 08	104 - 07	2500x45	40 - 220	PRM, VOR, RLS UVD
Manado (Sulavesi Is.)	01 - 32	124 - 55	2500x45	180 - 360	PRM, VOR, RLS UVD
Ujung Padang (Sulavesi Is.)	05 - 04	119 - 33	2500x45	130 - 310	PRM, VOR, RLS UVD

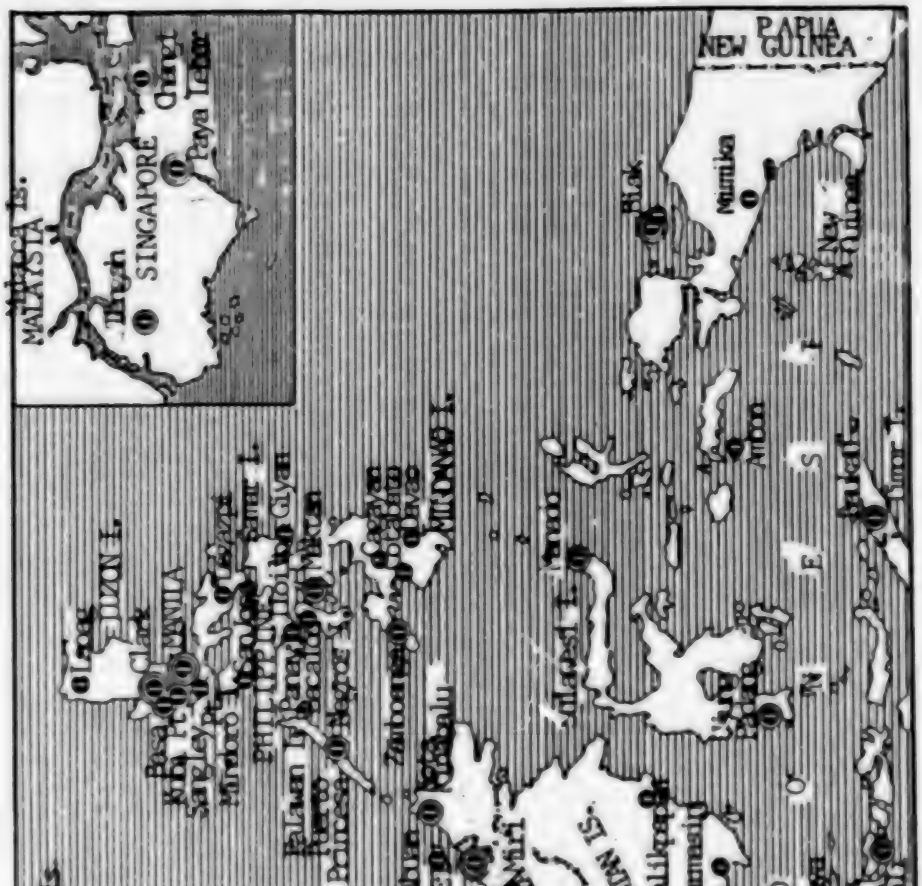
Biak (Biak Is.)	01 - 12*	136 - 06	3600x45	110 - 290	PRM, VOR, RLS UVD
Jakarta (Java Is.)	06 - 16*	106 - 53	3000x45	60 - 240	PRM, VOR, RLS UVD
Madiun (Java Is.)	07 - 38*	111 - 26	2550x60	170 - 350	PRM, TACAN
Bali (Bali Is.)	08 - 45*	115 - 10	2700x45	90 - 270	PRM, VOR, RLS UVD
Baukau (Timor Is.)	08 - 30*	126 - 23	2600x45	140 - 320	PRM
			Singapore		
Tengah	01 - 23	101 - 43	2800x45	180 - 360	PRM, TACAN, scanning RLS
Changi	01 - 22	103 - 59	4000x60	20 - 200	PRM, VOR, RLSX UVD
Paya Lebar	01 - 21	103 - 54	3800x60	20 - 200	scanning and landing RLS
			Brunei		
Bandar Seri Begawan	04 - 57	114 - 56	3650x60	30 - 210	PRM, VOR, RLS UVD

*Coordinates given in degrees and minutes of southern latitude.

The overall operational capacity of the airfield network in the ASEAN countries with dispersed airbasing (one air squadron consisting of 18-20 aircraft per airfield) is 1,300-1,500 aircraft. The airfields are stationed relatively uniformly on the territories of the ASEAN countries (Figure 1). At present they can be subdivided into airfields for basing of military and civil aviation, but a number of airfields are used simultaneously for both purposes: Basa, Manila, Maktan (Philippines); Bangkok and Hat Yai (Thailand); Changi (Singapore); Kuala Lumpur (Malaysia) and Jakarta (Indonesia).

The majority of airfields with main runways are built according to a standard plan. As a rule, they have one runway, a main taxiway which can be used for takeoff and landing in the event that the main runway is put out of action, group and individual aircraft parks, areas for aircraft on alert, POL supplies with above-ground, underground or semi-underground storage and technical and service buildings. Airfields where military aircraft are based also have semi-underground or above-ground ammunition depots, and some have aircraft shelters. Figure 2 shows the plan for the Utapao (Thailand) airfield, which is built according to the standard plan.

Ground radars deployed at airfields in the ASEAN countries are intended to support flights of military and civilian aviation. They consist of radar and navigation stations, as well as various types of homing beacons which operate



A -- pad for alert aircraft

B -- safety strip

C -- group aircraft stand and central refueling station

D -- control tower

E -- group aircraft stands

F -- main taxiway

G -- TACAN radio navigation system

H -- safety strip

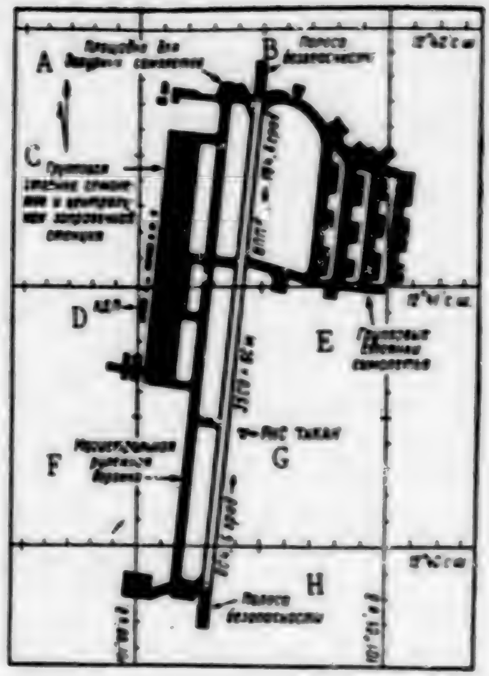


Figure 2.
Utapao, Thailand airfield plan, built according to standard design

autonomously or as a system, set up at places which have been precisely topographically surveyed.

Modern radio navigation, illumination and communications equipment has been deployed at the majority of the airfields with 2,500 meter and longer runways, which makes it possible to fly under simple and complex meteorological conditions both day and night. Close in navigation is provided by homing beacons, TACAN (Tactical Air Navigation) radar navigation systems; VOR (Very High Frequency Omnidirectional Range), direction finding radio navigation system, which provides homing of aircraft to the airfields and of flights along routes; VORTAC (colocated VOR and TACAN stations), a combination radio navigation system for close in navigation which combines elements of the VOR and TACAN systems; radar stations and flight control stations (RLS UVD); as well as other equipment. Course and glide ILS (instrument landing systems) have been installed at the largest airfields.

Airfields with a main runway of 1,800-2,500 meters are equipped with much poorer radar equipment. As a rule, it consists of various autonomous homing beacons, direction finders and air traffic control radar stations.

Brief descriptions of the airfield network in individual ASEAN countries are given below from foreign press data.

Philippines. The airfield network in the Philippines is considered the best prepared from the standpoint of means of airfield-technical, radio navigation and radio communications equipment. There are 17 airfields in the country

suitable for basing military aircraft (with a runway 1,800 meters or longer). If aircraft are based by squadrons the overall operational capacity of these airfields is 300-340 tactical aviation aircraft. The two largest airfields, Clark and Manila, have runways more than 3,000 meters long.

Clark is one of the forward U. S. Air Force airbases in the western part of the Pacific Ocean. The headquarters of the U. S. Air Force 13th Air Force, 3rd Tactical Fighter Wing and 374th Transport Air Wing are located there. They are most actively involved in joint exercises with the air forces of the ASEAN countries. In terms of its runway characteristics and radio navigation equipment the Manila airfield can be used for basing of American B-52 type strategic bombers. Philippines Air Force aviation is located at four main airfields: Basa, Manika, Maktan and Sangley Point.

Thailand. Thailand's airfield network has 15 airfields suitable for basing modern combat and auxiliary aircraft, of which 11 have runways more than 2,500 meters long. The overall operational capacity of the network is 270-300 aircraft if a squadron (18-20 aircraft) is based at an airfield. The main airfields at which Thailand's combat and auxiliary aircraft are based are Bangkok, Korat, Ubon, Udon Thani, Tak Li, Hat Yai and Phitsanulok. A special feature of the airfield network is the existence of a large number of airfields with runways over 3,000 meters long (six), which have modern radio navigation equipment that permits flights day and night under simple and complex weather conditions. Two airfields, Bangkok and Utapao, are suitable for basing American B-52 strategic bombers.

Malaysia. There are 11 airfields in Malaysia with main runways 1,800 meters long or longer, and at 5 of them the runways exceed 2,500 meters in length. The operational capacity of the airfield network is 200-220 tactical aviation aircraft (1 squadron based on each airfield). Subunits and units of national air forces are based at airfields at Butterworth, Kuantan, Kuala Lumpur and Labuan. In accordance with the five-sided agreement on the defense of Malaysia and Singapore (1971), along with Malaysian aviation one air defense air squadron (Mirage type aircraft) of the Australian Air Force is located at Butterworth Airfield. The Johor Baharu Airfield is suitable for possible basing of the American B-52 strategic bombers.

Indonesia. The airfield network of Indonesia consists of 27 airfields with main runways 1,800 meters in length or longer. At 10 of them runway length exceeds 2,500 meters. When basing is by a squadron (18-20 aircraft per airfield) its overall operational capacity is 490-540 tactical aviation aircraft. The main air force basing airfields are at Jakarta, Madiun, Malang, Pakanbaru and Ujung Padang. A feature of the Indonesian airfield network, according to the foreign press, is the fact that a substantial number of the airfields are inadequately equipped with modern radio navigation equipment and airfield technical flight support.

Singapore. The airfields at Paya Lebar and Tengah are used to base the combat aircraft of the Singapore Air Force. Some transport aircraft are constantly located at the Changi Airfield, which is operated jointly with civil aviation. The leaders of the Singapore armed forces pay great attention to air defense of the airfields at which their aviation is based. For these purposes, 24

Bloodhound air defense missile launchers; 6 Improved Hawk launchers and 10 Rapir launchers are deployed at positions near the airbases. The airfields at Paya Lebar and Changi can be used for deployment of U. S. strategic aviation aircraft.

Brunei. There is one airfield suitable for basing tactical and strategic aviation on Brunei -- Bandar Seri Begawan. At present it is used by civil aviation as an international airport.

According to foreign military specialists, the main directions for the modernization of the airfield network in the ASEAN countries are equipping the airfields with modern means of radio navigation and airfield technical support; constructing shelters for aircraft; increasing the number of single and group aircraft parks; and creating POL and ammunition reserves at airfields used for basing of combat aircraft.

9069
CSO: 1801/146

COMMENT ON U. S. STEALTH BOMBER (ATB)

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) p 93

[Article by Lt Col V. Yurtsev: "New American Bomber"]

[Text] In accordance with its concept of creating a qualitatively new means of arms conflict by the mid-1990's, the U. S. is conducting development of a future strategic bomber, the ATB (Advanced Technology Bomber), which has received the designation B-2. The lead contractor is the Northrop firm, with participation by Boeing. These companies were victorious in design competition conducted by the U. S. Air Force in 1981. The requirement to make maximum use of future technologies, including "stealth," was made a foundation of the work.

According to Western press reports, the B-2 aircraft is being structurally completed in a "flying wing" configuration. It will be equipped with four ducted-fan turbojet engines (being developed by General Electric based on the F101-GE-102 ducted-fan turbojet engines installed on the B-1-B bomber), placed on the outer wing panel. Air intake engines are built into the leading edges of the wing, and externally the engine nacelles have a relatively small tail. With a maximum takeoff weight of more than 180 tons, the new strategic bomber, which is expected to overcome enemy air defense systems at low altitudes, according to American military specialists will be able to carry approximately an 18 ton load and have a range without aerial refueling of more than 9,000 km at a speed of Mach 0.85. It is to be adapted to use all types of aviation weapons, including cruise missiles with nuclear warheads, which will be placed in revolving type launchers inside the fuselage. For the future the possibility of employing fundamentally new types of weapons, such as laser weapons, for self defense is being examined.

Plans are to reduce the vulnerability of the B-2 and enable it to overcome an enemy air defense system reliably mainly by employing passive and active means of "stealth" technology. Primary attention is being paid to reducing the capability for radar detection of the aircraft by substantially reducing its effective scattering area. For this purpose, along with perfecting and selecting appropriate aerodynamic forms and design decisions for elements of the airframe, much attention is being paid to the use of composite construction materials and highly effective coatings with absorption or

dissipation characteristics. Substantial efforts are also being undertaken to reduce the intensity of infrared radiation, especially of engine emissions. The main measures in this field are considered to be installation of various screens, which cover the most heated portions of the engines; extensive use of composite materials in their design; and special fuel additives which reduce the intensity of infrared radiation or change its spectrum.

The foreign press notes that a number of future technologies will also be introduced during the manufacture of the onboard equipment for the B-2, including fiberoptics in the flight control systems; super-fast integrated circuits and elements of artificial intelligence; and satellite communications. Plans are to organize series production of the B-2 aircraft at a factory in Palmdale, California, where the development of production capacities for these purposes is already underway. Construction of an experimental model is to begin in the near future. It is planned that flight testing of the new aircraft will begin in 1987, and its arrival in the U. S. Air Force inventory is expected in the early 1990s. The Pentagon intends to acquire a total of 132 B-2 bombers.

9069
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FRG 'WILDCAT' SELF-PROPELLED ANTI-AIRCRAFT SYSTEM

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 2, Feb 87 (signed to press 3 Feb 87) p 94

[Article by Col N. Fomich]

[Text] The foreign press reports that testing of experimental models of the Wildcat ZSU [self-propelled anti-aircraft system], developed by the West German firm Krauss-Maffey, were carried out in the early 1980s in the FRG.

This ZSU has been mounted on a wheeled (6 x 6) armored personnel carrier. It is armed with two 30 mm Mauzer automatic guns, mounted on the sides of a revolving armored turret. The maximum effective slant range of fire is 3,000 meters, its rate of fire is 800 rounds per minute and its basic load is 500 rounds.

The MPDR-18X pulse-doppler radar, with a range of up to 18 km, is used to detect aerial targets. A television apparatus tracks the selected target. The fire control system also includes a laser rangefinder and electronic ballistic calculator. The last two experimental models of the ZSU (a total of six have been created) were also equipped with tracking radar.

The combat weight of the Wildcat ZSU is 18.5 tons; it has a crew of three. The commander is located in the turret and the operator and driver-mechanic are in the forward section of the hull. The power plant is an 8-cylinder, 320 horsepower turbocharged diesel engine. Its maximum highway speed is 80 km per hour, and it has a cruising range of 600 km.

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